

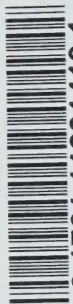


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# Main Report

## HIGHWAY 404 EXTENSION

Davis Drive (York Regional Rd. 31)  
to Highway 12

Route Planning Study and  
Environmental Assessment

Central Region  
W.P. 299-86-00

Prepared by:

COLE, SHERMAN & ASSOCIATES LTD.

December, 1997





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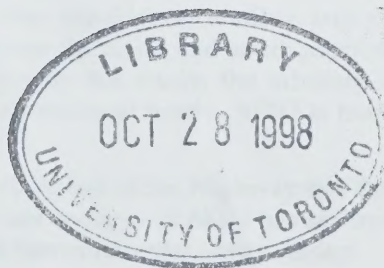
# Executive Summary

## **HIGHWAY 404 EXTENSION**

**Davis Drive (York Regional Rd. 31)  
to Highway 12**

**Route Planning Study and  
Environmental Assessment**

**Central Region  
W.P. 299-86-00**



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## 1.0 THE UNDERTAKING/EA APPROVALS BEING SOUGHT

The Highway 404 Extension Environmental Assessment Report documents an Environmental Assessment Study undertaken by the Ministry of Transportation for the extension of Highway 404 from Davis Drive to Highway 12.

The need for the extension of Highway 404 is to serve future long distance commuter and recreational traffic (up to the 2021 horizon year) travelling between northern York and Durham Regions, and southern York Region/Metro Toronto (refer to Exhibit 1).

This study followed a consultation process which included external agency, municipal staff and council reviews, and public consultation through information centres at each phase of the study. The study also incorporated additional workshops, presentations and meetings with interested individuals to identify and address concerns.

If this Environmental Assessment is approved, the Ministry of Transportation will then be in a position to:

- make refinements to the alignment and right-of-way during the design phase.
- designate right-of-way and thus protect a right-of-way for the eventual implementation of the recommended transportation improvement identified in Section 1.2 of the report;
- acquire the property needed to build the facility and associated features, which may include, but are not limited to: stormwater management facilities, service stations, temporary construction easements, mitigation/compensation measures and access roads.
- proceed with the pre-design, final design and contract preparation for the necessary works;
- carry out construction of the final design in a staged manner;
- operate and maintain the completed highway; and,
- initiate a process for addressing new concerns.

The ministry has been conducting another study to address short to mid-term operational improvements between the north and south junctions of Highway 12/48. In recognition of the findings of the Highway 404 study, the ministry has modified the Highway 12/48 study to address long-term recreational needs. MTO is therefore suggesting the following condition of approval:

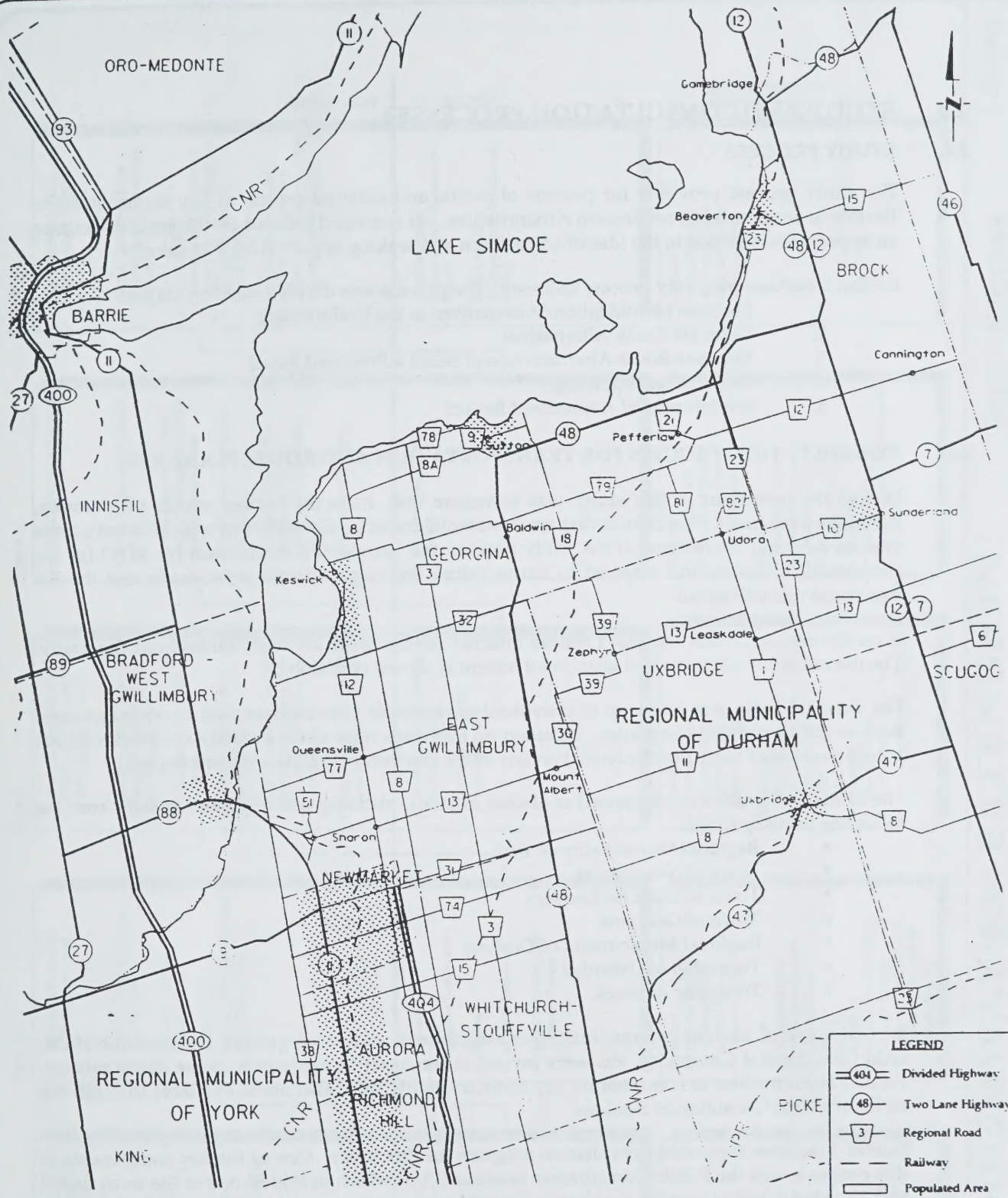
**Construction of the Highway 404 Extension north of Green Lane (Herald Road) may not occur until MTO has secured environmental clearance for the Highway 12/48 Environmental Study Report**

The reason for not applying this condition from Green Lane (Herald Road) southerly is that the Region of York has already secured environmental clearance for the section of Highway 404 from Davis Drive to Green Lane as part of their Green Lane Corridor Study.

**Note: The approval being sought by this EA, and the commitments made in this EA, will apply to and be binding upon the Ministry of Transportation, its agents, successors, transfers and/or assigns, and will be applicable to the design, construction, operation and maintenance of the undertaking.**







## TRANSPORTATION NETWORK IN NORTHERN YORK AND DURHAM REGIONS

# HIGHWAY 404 EXTENSION

## Davis Drive to Highway 12

Route Planning Study and Environmental Assessment



## **2.0 STUDY AND CONSULTATION PROCESSES**

### **2.1 STUDY PROCESS**

The study process provided for periods of public and external review at key stages and was flexible to accommodate unforeseen circumstances, yet remained focused on the goals of defining an appropriate solution to the identified problem and seeking approval for that solution.

Exhibit 2 outlines the study process followed. The process was divided into five stages:

1. Problem Identification/Alternatives to the Undertaking
2. Generate Route Alternatives
3. Evaluate Route Alternatives and Select a Preferred Route
4. Prepare Concept Design
5. Environmental Assessment Report

### **2.2 CONSULTATION PROCESS FOR TRANSPORTATION AND ROUTE PLANNING**

One of the intentions of this study was to ensure that, from the earliest stages of planning, decisions were made after considering environmental impacts. Consultation with affected parties was an essential component of the study process and provided a mechanism for MTO (as the proponent) to define and respond to issues before limiting decisions were made and the EA document was submitted.

A multi-team approach was used ensure affected parties were involved throughout the study. The overall study schedule and team involvement is shown on Exhibit 3.

The External Team was made up of provincial government ministries as well as other agencies, such as utility and rail companies. Included on this team were those ministries/agencies which would eventually carry out the formal review of the Environmental Assessment Report.

The Municipal Team was comprised of elected officials, planning and engineering staff from the following municipalities:

- Regional Municipality of York
- Town of Newmarket
- Town of East Gwillimbury
- Town of Georgina
- Regional Municipality of Durham
- Township of Uxbridge
- Township of Brock

Interest Groups, such as cottage/ratepayer associations, naturalist groups, snowmobile clubs, local Chambers of Commerce, etc. were invited at the onset to participate in the study process. Formal opportunities to comment on key decision points were also made available through the series of Public Consultation Sessions.

Exhibit 4 outlines the public consultation program for this study. One of the key components of this program was the Public Consultation Sessions (PCS) which provided one of the most useful and beneficial techniques of exchanging information with the public. Public Consultation Sessions provided:

- a forum for reviewing project decisions to date and for providing comments to the Project Team as an input to further development of the proposal;
- a means of gathering additional study area information;
- an opportunity to address individual needs for information;
- follow-up on matters of specific interest to the individual; and,
- an opportunity to learn about potential effects on individual properties.



Stage 1

**PROBLEM IDENTIFICATION/  
ALTERNATIVES TO THE  
UNDERTAKING**

- Review Background Information
- Transportation Need Analysis
- Formulate Statement of Problem/Opportunity
- Analysis of Alternatives to the Undertaking

**ACTIVITIES**

- Confirmation of Need for Transportation Service
- Draft Environmental Assessment Proposal
- Final Environmental Assessment Proposal

**PRODUCTS**

- STAKEHOLDER INVOLVEMENT**
- Contacted:
- External Team
  - Municipal Team
  - Interest Groups
  - General Public
- Met with:
- Municipal Team
  - Municipal Councils
  - External Team
  - MNR
  - LSRCA
  - OMAFRA
  - Interest Groups
  - General Public (PCS #1 & PCS #2)

Stage 2

**GENERATE ROUTE  
ALTERNATIVES**

- Identify Significant Study Area Features
- Identify Corridor Opportunities
- Refine Corridor Opportunities and Generate Route Alternatives

- Corridors
- Corridor Refinements
- Routes
- Route Refinements
- Initial Environmental Technical Papers

- STAKEHOLDER INVOLVEMENT**
- Contacted:
- External Team
  - Municipal Team
  - Interest Groups
  - General Public
- Met with:
- Municipal Team
  - Municipal Councils
  - External Team
  - MNR
  - LSRCA
  - OMAFRA
  - MMA/OGTA/MOEE
  - Interest Groups
  - General Public (PCS #2, Workshop #1, PCS #3 & Workshop #2)

Stage 3

**EVALUATE ROUTE  
ALTERNATIVES/SELECT A  
PREFERRED ROUTE**

- Identification of Potential Impacts Associated with each Alternative
- Identification of Mitigation Measure
- Determine Net Effects of each alternative
- Evaluate Alternatives using Net Impact Assessment Approach and Weighting/Scoring Method
- Identification of Technically Preferred Route

- Selection of the Technically Preferred Route
- Final Environmental Technical Reports

- STAKEHOLDER INVOLVEMENT**
- Contacted:
- External Team
  - Municipal Team
  - Interest Groups
  - General Public
- Met with:
- Municipal Team
  - Municipal Councils
  - External Team
  - MNR
  - LSRCA
  - OMAFRA
  - Interest Groups
  - General Public (PCS #4 & Workshop #3)

Stage 4

**PREPARE CONCEPT DESIGN**

- Refine Technically Preferred Route
- Identification of Potential Impacts Associated with the Recommended Route
- Identification of Mitigation Measures
- Recommendations for Monitoring and Commitments to Further Work
- Prepare Concept Design

- Preparation of Concept Design

- STAKEHOLDER INVOLVEMENT**
- Contacted:
- External Team
  - Municipal Team
  - Interest Groups
  - General Public
- Met with:
- Municipal Team
  - Municipal Councils
  - External Team
  - MNR
  - LSRCA
  - OMAFRA
  - Interest Groups
  - General Public (PCS #4 & #5)

Stage 5

**ENVIRONMENTAL  
ASSESSMENT REPORT**

- Prepare Draft One-Stage Environmental Assessment Report
- Circulate Draft Environmental Assessment Report to External Team, Municipal Team, and Stakeholders
- Finalize Environmental Assessment Report and Submit to the Ministry of the Environment and Energy

- Draft One-Stage Environmental Assessment Report
- Final One-Stage Environmental Assessment Report

- STAKEHOLDER INVOLVEMENT**
- Contacted:
- External Team
  - Municipal Team
  - Interest Groups
  - General Public



**Ontario**  
Ministry of Transportation



# HIGHWAY 404 EXTENSION

## Davis Drive to Highway 12

### Route Planning Study and Environmental Assessment

## STUDY PROCESS

EXHIBIT

2



| STAGE  | 1993   |        |      | 1994   |        |        | 1995 |        |        | 1996   |      |        | 1997   |        |
|--|--------|--------|------|--------|--------|--------|------|--------|--------|--------|------|--------|--------|--------|
|  | Spring | Summer | Fall | Winter | Spring | Summer | Fall | Winter | Spring | Summer | Fall | Winter | Spring | Summer |
| 1 Problem Identification/<br>Alternatives to the Undertaking |        |        |      |        |        |        |      |        |        |        |      |        |        |        |
| 2 Generate Route Alternatives                                |        |        |      |        |        |        |      |        |        |        |      |        |        |        |
| 3 Evaluate Route Alternatives                                |        |        |      |        |        |        |      |        |        |        |      |        |        |        |
| 4 Prepare Concept Design                                     |        |        |      |        |        |        |      |        |        |        |      |        |        |        |
| 5 Environmental Assessment Report                            |        |        |      |        |        |        |      |        |        |        |      |        |        |        |
| External Team Meeting  |        |        |      |        |        |        |      |        |        |        |      |        |        |        |
| York Region  |        |        |      |        |        |        |      |        |        |        |      |        |        |        |
| Durham Region  |        |        |      |        |        |        |      |        |        |        |      |        |        |        |
| Town of Newmarket  |        |        |      |        |        |        |      |        |        |        |      |        |        |        |
| Town of East Gwillimbury                                     |        |        |      |        |        |        |      |        |        |        |      |        |        |        |
| Town of Georgina   |        |        |      |        |        |        |      |        |        |        |      |        |        |        |
| Township of Uxbridge   |        |        |      |        |        |        |      |        |        |        |      |        |        |        |
| Township of Brock  |        |        |      |        |        |        |      |        |        |        |      |        |        |        |
| Ministry of Natural Resources                                |        |        |      |        |        |        |      |        |        |        |      |        |        |        |
| Lake Simcoe Region Conservation<br>Authority                 |        |        |      |        |        |        |      |        |        |        |      |        |        |        |
| Ministry of Agriculture, Food &<br>Rural Affairs             |        |        |      |        |        |        |      |        |        |        |      |        |        |        |
| Ministry of Environment & Energy                             |        |        |      |        |        |        |      |        |        |        |      |        |        |        |
| Ministry of Municipal Affairs and<br>Office of the GTA       |        |        |      |        |        |        |      |        |        |        |      |        |        |        |
| Stakeholders Meetings  |        |        |      |        |        |        |      |        |        |        |      |        |        |        |
| Public Consultation Sessions                                 |        |        |      |        |        |        |      |        |        |        |      |        |        |        |
| Workshops  |        |        |      |        |        |        |      |        |        |        |      |        |        |        |

a South Lake Simcoe Naturalist Club - September 6, 1994

b Pefferlaw Ratepayers Association - September 20, 1994

c Information Meeting Arranged by P.A.T.H. - October 4, 1994

d Site Visit with P.A.T.H.-October 25, 1994

e Information Meeting for Brock Residents - November 22, 1994

f Information Meeting Arranged by Safe Truckers Ontario Police - November 8, 1994

g Site visit with Brock Area Resident-April 6, 1995

h Site visit with Pefferlaw Area Residents-April 3, 1995

i Presentation to STOP (Safe Truckers Ontario Police)-June 26, 1997

▲ First set of Public Consultation Sessions were held on June 22, 23, 28 and 29, 1993

▼ Second set of Public Consultation Sessions were held on June 14, 21, 22, 23 and 24, 1994

▷ First set of Workshops were held September 12, 19, 21, 22 and November 21, 1994

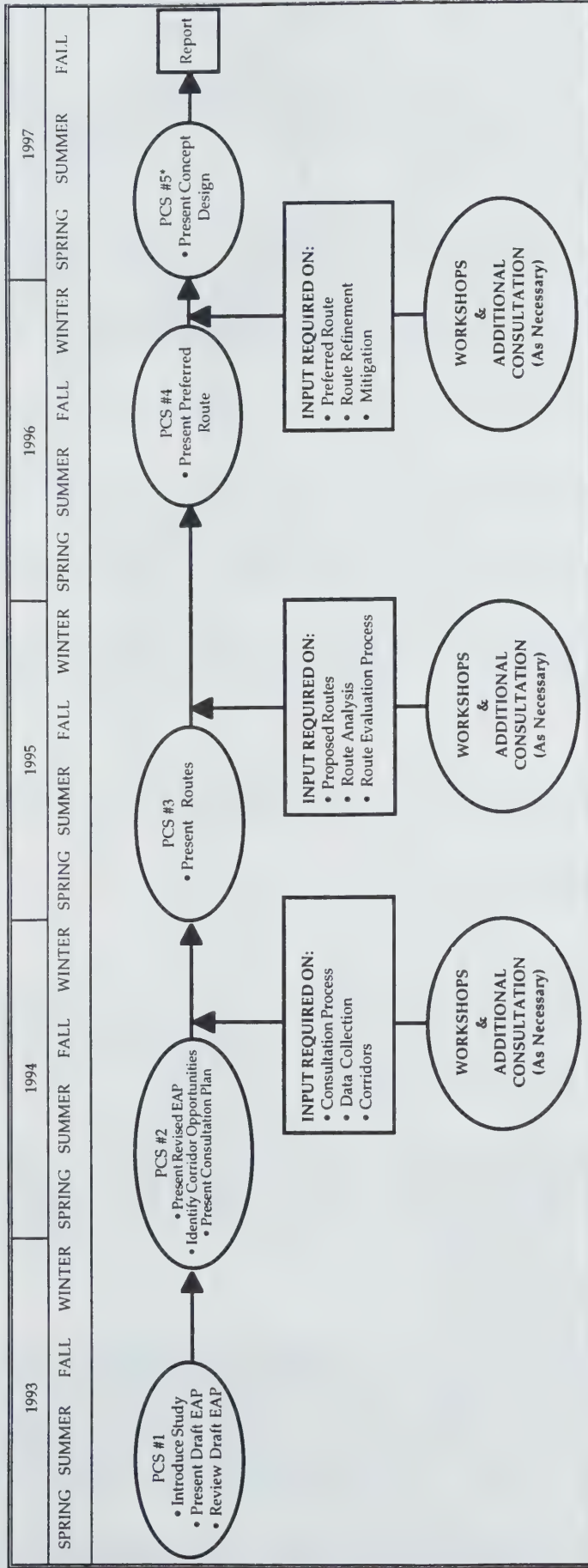
\* Third set of Public Consultation Sessions were held on March 27, 28, 29, April 3 and 6, 1995

■ Second set of Workshops were held June 22, 26, 27, 29 and July 5 1995

◆ Fourth set of Public Consultation Sessions were held on November 12, 18, and 19, 1996

□ Fifth set of Public Consultation Sessions were held on June 3, and 5, 1997





PCS - Public Consultation Session

\* PCS #5 included both a Public Consultation Session Component and a Workshop Component

In addition, follow-up activities such as workshops, working meetings, focus group meetings and/or field trips were undertaken at key decision points.

## **2.3 ENVIRONMENTAL ASSESSMENT PROPOSAL**

At the initiation of this project, an Environmental Assessment Proposal (EAP) was prepared which incorporated the procedures and principles of the Ministry of Environment and Energy's May 1992 publication "EAP Guidelines". The primary purpose of the Highway 404 Extension EAP was to provide a focus for early and meaningful consultation on the proposed planning process. In addition to the planning process, the EAP specifically addressed:

- The problem/opportunity;
- The proposed study area;
- The transportation alternatives being considered (Alternatives to the Undertaking);
- The proposed evaluation process; and
- The proposed consultation plan.

The draft EAP was made available for public and agency review in June 1993. Four distinct groups of stakeholders were identified as participants in the review process: interested individuals, interest groups, external team and municipal team.

The comments received from the stakeholder review resulted in specific changes being made to the draft EAP. The Final EAP for the Highway 404 Extension was published in June, 1994, and is available from MTO.

Chapter 2 of the EA Report provides a detailed description of the study and consultation processes implemented for this project, and documents how consultation was incorporated in the decision-making.

## **3.0 TRANSPORTATION NEEDS ASSESSMENT**

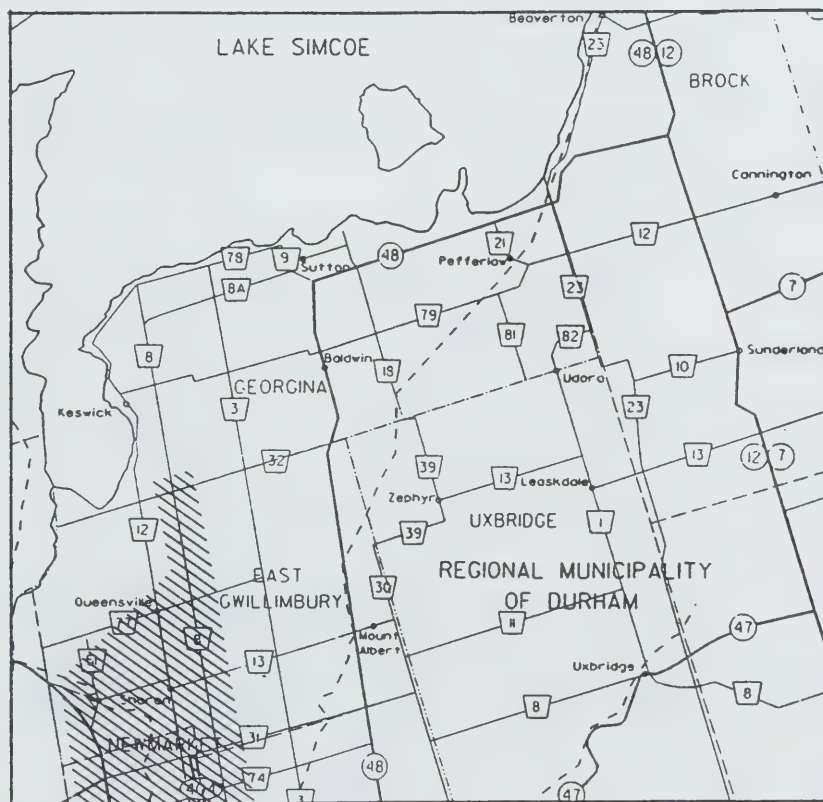
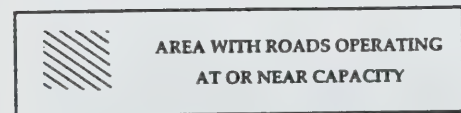
### **3.1 PROBLEM STATEMENT**

The problem addressed in this study is a deficiency in the capacity of the transportation network in northern York and Durham Regions to accommodate forecasted commuter and recreational travel needs. Forecasted commuter trips indicate that transportation improvements are necessary to improve capacity of the network. Improvements to the transportation network are also required to meet weekend travel demands to areas north and east of Lake Simcoe .

The study also addresses the opportunity to identify a plan which addresses this problem and allows for the protection of the Ministry of Transportation's long-term strategic goals for the movement of people and goods through northern York and Durham Regions, given the diminishing opportunity to protect for the long-term transportation needs in a cost-effective, non-disruptive manner.

#### **Existing Conditions - Commuter Trips**

During weekday morning peak periods, traffic from Newmarket, East Gwillimbury, Georgina and portions of northern Durham Region converge on the Davis Drive terminus to access Highway 404. As a result, Davis Drive and sections of Leslie Street and Woodbine Avenue north of Davis Drive experience traffic congestion during these times (refer to Exhibit 5). This scenario is repeated during afternoon peak periods as commuters return to northern York and Durham Regions.





### **Future Conditions - Commuter Trips**

By the year 2011, population and employment levels in York and Durham Regions are expected to double to approximately 1.9 million residents and 810,000 jobs. This increase in population and employment will result in an increase in commuter trips to central and southern York Region and Metropolitan Toronto.

To assess the impact of this growth on the area's transportation network, a transportation modeling exercise was undertaken. The modeling exercise assessed transportation conditions based on the future roadway and transit networks in south-central Ontario in year 2011 and determined the trip volumes (expressed as number of vehicles) between zones within south-central Ontario during morning peak periods. The model incorporated the future road network of this area, based on road improvements planned to be completed by York Region, Durham Region and MTO by the year 2011.

The impacts of the forecasted traffic volumes on the future road network is congestion on much of the network, as illustrated in Exhibit 6. Further transportation improvements are therefore required to reduce the impacts of forecasted commuter traffic volumes on the transportation network in northern York and Durham Regions during weekday morning and afternoon peak periods.

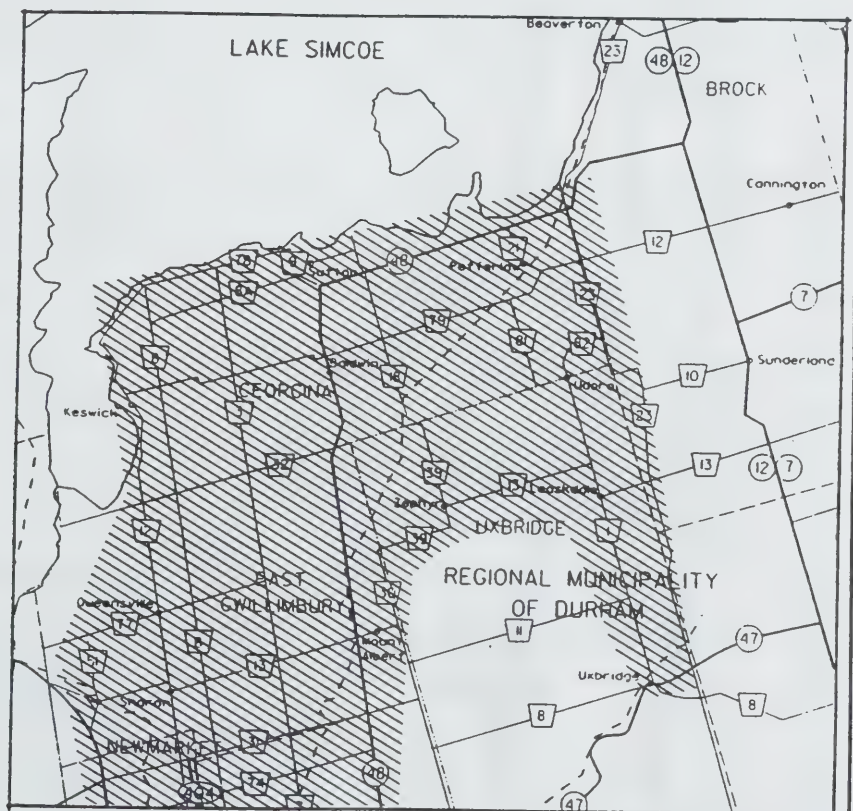
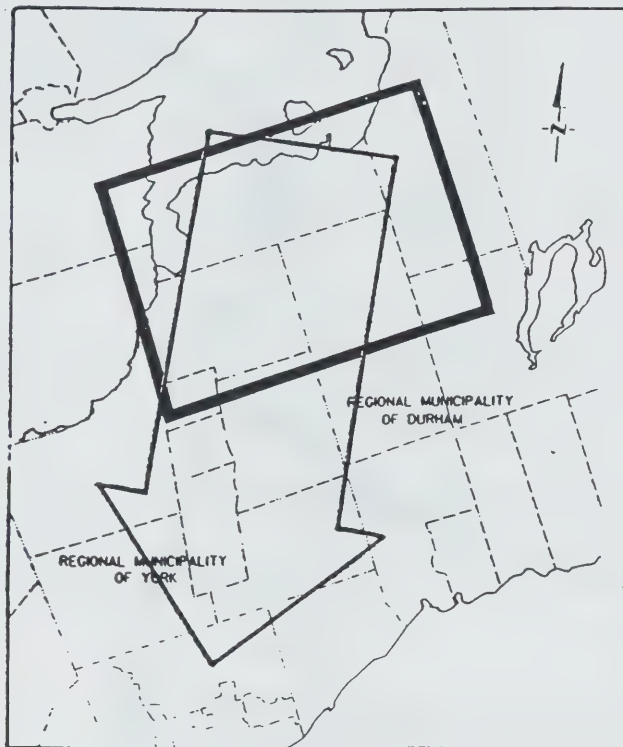
### **Existing Conditions - Recreational Trips**

The nature of long-distance recreational travel between south-central Ontario and areas north and east of Lake Simcoe favours roadway-based travel modes. The principal routes for traffic traveling between south-central Ontario and areas north and east of Lake Simcoe are the Highway 400 corridor around the west side of Lake Simcoe, and Highways 12 and 48 around the east side of the Lake.

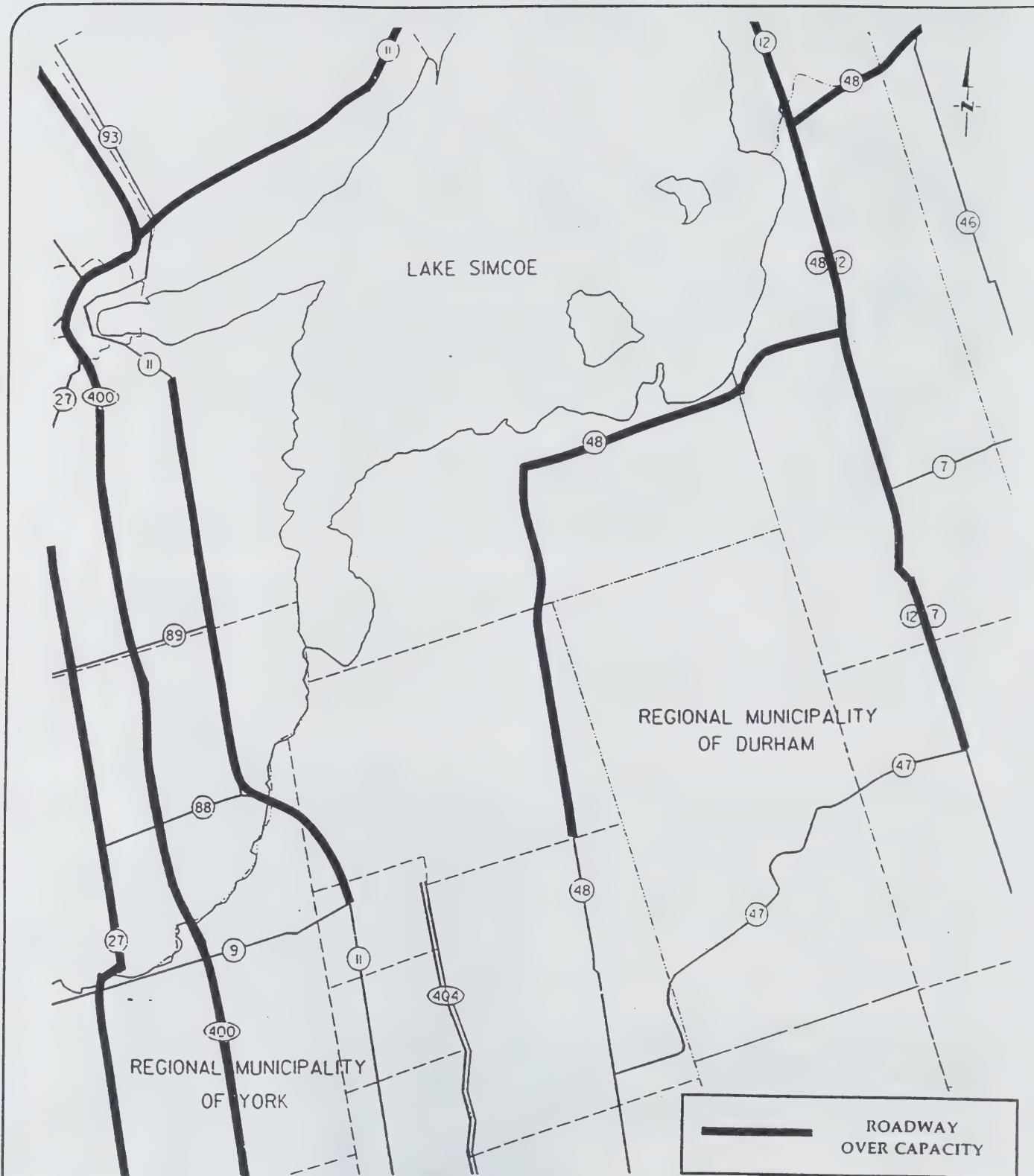
The Highway 400 corridor around the west side of Lake Simcoe operates at capacity during weekend peak periods (typically Friday and Sunday afternoons). Along the east side of the lake, Highway 48 and Highway 12 are two-lane highways providing arterial service to portions of York and Durham Regions, and serving long-distance traffic between south-central Ontario and areas north and east of Lake Simcoe. Highway 48 intersects Highway 12 east of Pefferlaw, and again south of Cambridge. The two-lane roadway between these two junctions is designated as Highway 12/48. This merger of four traffic lanes to two lanes reduces capacity in the Highway 12 corridor to that of a single two-lane highway.

### **Future Conditions - Recreational Trips**

Capacity deficiencies around the east side of Lake Simcoe will result in traffic congestion on the highway network during weekend peak periods (refer to Exhibit 7). Highways 12 and 48 are the only provincial highway facilities serving the recreational traffic traveling around the east side of Lake Simcoe. At the southeast corner of Lake Simcoe, where Highways 12 and 48 merge to become a single two-lane highway, the capacity of this roadway is insufficient to meet the needs of the forecasted recreational traffic volumes.



## TRAFFIC OPERATIONS ON FUTURE ROAD NETWORK (2011 AM PEAK HOUR)



**TRAFFIC OPERATIONS ON FUTURE HIGHWAY NETWORK  
(2011 SUMMER SUNDAY PM PEAK HOUR)**



### 3.2 OPPORTUNITY

Transportation improvements are required in northern York and Durham Regions to address transportation network deficiencies associated with forecasted commuter and recreational travel needs.

In recognition of increasing development pressures in northern York and Durham Regions, the long-term transportation needs of this area were assessed to define and designate the property or right-of-way which may be required as early as possible, so that adequate property can be set aside for transportation improvements prior to it being developed or otherwise constrained any further.

### 3.3 ALTERNATIVES TO THE UNDERTAKING

Four types of alternatives to the undertaking were assessed for their reasonableness in addressing this problem.

#### **Do Nothing**

Do Nothing usually means to maintain the status quo of transportation infrastructure and services (as of 1993), with no significant changes or actions being taken to either manage demand, expand infrastructure, or improve operations. For this study, the Do Nothing alternative assumes all currently planned transportation infrastructure improvements to be undertaken by York Region, Durham Region and MTO will take place.

#### **Manage Transportation Demand**

Managing transportation demand includes the implementation of measures to sufficiently reduce, shift, or eliminate transportation demand, such that improvements to transportation infrastructure/operation within the study area are not required.

#### **Non-Roadway Solutions- Improve Existing or Introduce New Facilities**

Transportation facilities or mode types may be improved or introduced to expand the capacity of the transportation system, offer a new choice to the user, and contribute to the resolution of the stated problems/opportunities. Non-roadway solutions would be air-, rail-, or water-based, requiring the associated infrastructure such as airports, railways, and lake/river/canal systems respectively. Rail-based solutions could be further subdivided into interurban passenger rail (VIA, GO Transit trains), intra-urban passenger rail (subway, light rail and freight rail (CN, CP).

#### **Roadway Solutions- Improve Existing or Introduce New Facilities**

Roadway solutions include improvements to existing transportation services and facilities, and the introduction of new services and facilities. Such solutions include:

- roadway operation improvements
- roadway infrastructure improvements
- roadway infrastructure additions; and,
- roadway-based modal additions

Of the four types of alternatives assessed for their ability to resolve these problems, only "Roadway Solutions" was identified as a reasonable alternative. Of the four roadway solutions assessed, only "Roadway Infrastructure Additions" was initially identified as a reasonable alternative. The alternatives will be located in a corridor extending from the existing terminus of Highway 404 at Davis Drive to Highway 12.

### 3.4 STUDY AREA

The study area for developing corridors and routes for the extension of Highway 404 was based upon forecasted transportation deficiencies and the assumed extent of any effects of the proposed alternatives. The study area is shown in Exhibit 8.

Chapter 3 of the EA Report describes the transportation problems and opportunities to be resolved by this study. In addition, alternatives to the undertaking are identified and assessed for their ability to reasonably resolve these problems/opportunities. The study area limits for alternative methods are also defined in this chapter.

## 4.0 CORRIDOR PLANNING AND ROUTE PLANNING

The goal of route generation was to generate reasonable route alternatives by eliminating areas unsuitable for highway development early in the process. To accomplish this, a six step process was employed:

- Step 1: Identify Significant Study Area Features
- Step 2: Identify Corridor Opportunities
- Step 3: Refine Corridor Opportunities
- Step 4: Generate Route Alternatives
- Step 5: Analyze Route Alternatives
- Step 6: Select Preferred Route

Alternative route segments were identified (refer to Exhibit 9) and assessed with respect to their impacts as measured by indicators grouped under the following factors:

- Transportation (includes Cost)
- Natural Environment
- Social Environment
- Economic Environment
- Cultural Environment

The evaluation of route alternatives identified route segments A/North/E1 as the preferred route alternative for extending Highway 404.

Extending Highway 404 addresses both the need and opportunity to protect for the implementation of transportation improvements in northern York and Durham Regions.

#### Between Davis Drive and Durham Road 23.

- a freeway is required to improve capacity of the network to accommodate forecasted commuter needs;
- a freeway is required to improve capacity of the network to accommodate forecasted recreational travel needs; and,
- opportunities for protecting property or right-of-way for a new highway are continuing to be diminished by proposed approved development in areas around Sharon, Queensville, Keswick, Sutton and Pefferlaw.





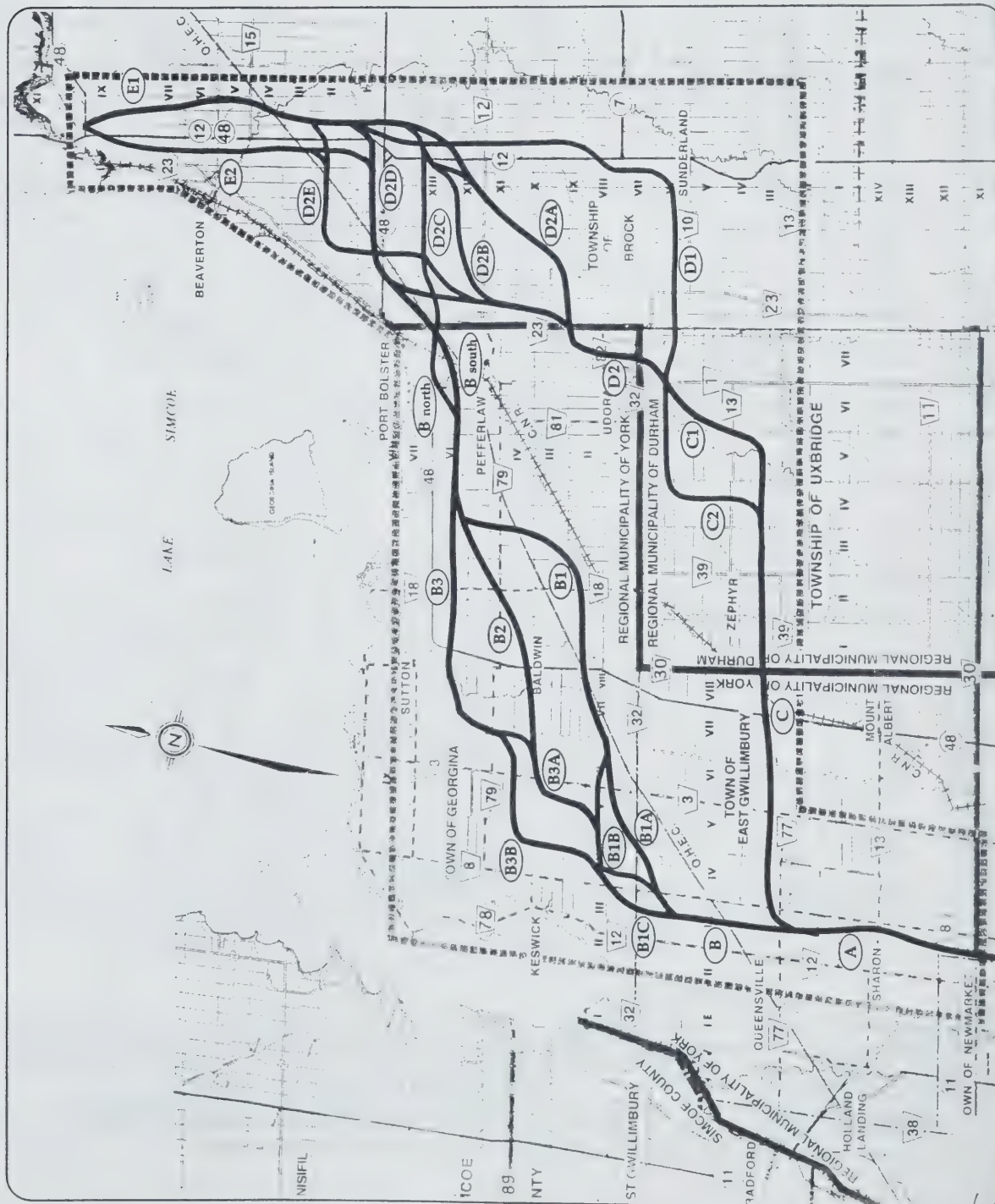
## STUDY AREA

# HIGHWAY 404 EXTENSION

## Davis Drive to Highway 12

Route Planning Study and Environmental Assessment

## Davis Drive to Highway 12





From east of Durham Road 23 to the south junction of Highway 12/48:

- the projected weekday/commuter peak hour traffic volumes for 2021 are less than that which warrants a freeway, but slightly greater than the capacity of a 2-lane highway;
- the projected recreational peak hour traffic volumes are greater than the projected 2021 commuter peak hour traffic volumes, but are within the capacity of a 4-lane highway.

Therefore, to address the weekday/commuter and recreational 2021 peak period traffic demands east of Durham Road 23 to the south junction of Highway 12/48, a 4-lane highway is required.

Between the north and south junctions of Highway 12/48:

- the projected weekday/commuter volumes for 2021 are less than that which warrants a freeway, and slightly less than the capacity of a 2-lane highway;
- the projected recreational volumes are greater than the capacity of a 2-lane highway, but are within the capacity of a 4-lane highway.

The ministry has been conducting another study to address short- to mid-term operational improvements between the north and south junctions of Highway 12/48. In recognition of the findings of the Highway 404 study, the ministry has modified the Highway 12/48 study to address long-term recreational needs, and has suggested the condition of approval regarding the Highway 12/48 study, identified in Section 1.0 of this Executive Summary and Section 1.3 of the EA Report.

Based on comments received at the fourth series of PCSs, refinements were made to the Preferred Alternative where it was shown that such refinements would result in an overall reduction in impacts.

The Technically Preferred Route is shown in Exhibit 10. Chapter 4 of the EA Report describes the corridor and route planning phase of the study, including the analysis and evaluation of route alternatives, in detail.

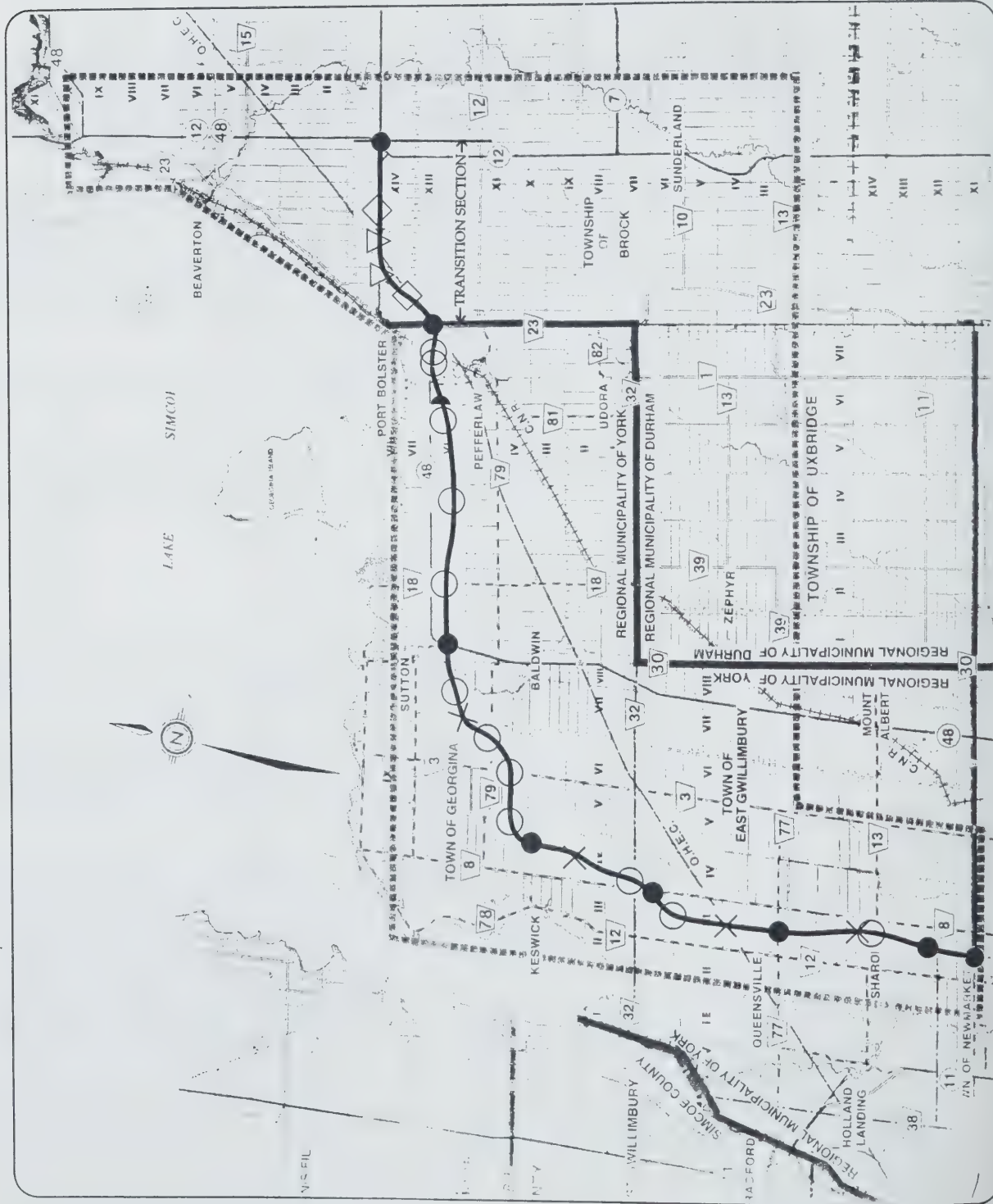
## **5.0 DESCRIPTION OF THE UNDERTAKING**

### **5.1 DESCRIPTION OF THE UNDERTAKING**

The proposed undertaking consists of approximately 45 kilometres of new four-lane divided highway with controlled access extending northerly from Davis Drive to Durham Road 23, and a 9 kilometre transition section between Durham Road 23 and Highway 12.

The four-lane highway will feature two lanes of traffic per direction, separated by a 30 metre wide median within a basic minimum right-of-way of 100 metres (the width of the median and right-of-way is reduced through the Pepperlaw area). The "controlled access" designation will restrict direct access to the highway to interchange locations.

The transition section will consist of a four-lane divided highway with limited access (right in; right out). The existing Highway 48 right-of-way will be widened to accommodate a grass median and intersections at Brock Concession Road 14 and Brock Sideroad 17. The existing intersection of Highway 48 and Highway 12 will be upgraded to an interchange. Turning basins at these intersections will be incorporated to address safety concerns for slow-moving vehicles. In addition, the highway right-of-way in the transition section will be designated "special controlled access". Under this designation, no new entrances to the highway will be permitted, and conversion of existing entrances (i.e. from field entrance to residential entrance) will be subject to review by MTO.



## TECHNICALLY PREFERRED ROUTE

### LEGEND

- STUDY AREA LIMIT
- INTERCHANGE LOCATIONS
- GRADE SEPARATION
- ROAD CLOSING
- AT GRADE INTERSECTION
- RIGHT IN, RIGHT OUT INTERSECTION



## HIGHWAY 404 EXTENSION

Davis Drive to Highway 12

Route Planning Study and  
Environmental Assessment



Ministry of Transportation

EXHIBIT

10



Implementation of the undertaking will take place over a number of years and reflect financial constraints and traffic demands. It is likely that the implementation of the project will be staged. This staging may include:

- Construction from Davis Drive (existing terminus);
- Construction to consist of 2 lanes per direction plus auxiliary lanes where required;
- Opening of the highway to traffic as sections become available for use;
- Staging of some interchanges and grade separations depending on traffic demands/network development. Staging of interchange ramps to provide for moves restricted to certain directions initially with others being added when traffic demands/network development warrant.

## 5.2 Summary of Environmental Effects/Mitigation Measures/Commitments to Future Work

During the consultation phase of the study, numerous specific commitments were made to ensure that environmental impacts were reduced. These commitments are detailed in Chapter 5 of the EA Report and summarized in **Exhibit 11 - Environmental Issues and Commitments**.

Exhibit 11 documents the potential effects, proposed mitigation and commitments to future work, and the concerned group or agency. Appropriate mitigation will be developed by the proponent during the detail design phase and will be reviewed with the proper ministries and agencies to address their concerns and legislative requirements prior to implementation.

## 5.3 Process For Addressing New Concerns

The Ministry of Transportation (MTO), in submitting this Environmental Assessment to the Ministry of Environment and Energy (MOEE), has attempted to provide as much detail as possible about both the undertaking itself, and the anticipated net environmental impacts. After approval under the Environmental Assessment Act is granted for an undertaking, the standard approach is to initiate further technical investigations during the design phase of the project. In addition to the more detailed technical work, further consultation with all stakeholders is also undertaken at that time. Issues and concerns which are raised during the detail design are documented and addressed in Design and Construction Reports, which are filed for information purposes prior to any construction.

MTO is committed to addressing the environmental concerns resulting from this undertaking whether identified in the Environmental Assessment Report or during the design phase prior to construction. MTO will screen all component projects of this undertaking during their design for new concerns. *New concerns are defined to include only those concerns which have not already been identified in this Environmental Assessment Report.*

Chapter 5 of the EA Report provides a detailed description of the undertaking, as well as, the effects, mitigation measures and commitments to future work.

## **1.0 Transportation**

### **1.1 Traffic Operations**

#### **Potential Effect**

- Proposed highway will allow traffic to move more efficiently through study area.

#### **Proposed Mitigation/Commitments to Future Work**

- Monitor traffic volumes on road network; stage construction to meet traffic warrants.

#### **Concerned Group/Agency**

- MTO, Municipalities, Public

#### **Section Reference**

- 5.2.8 and 5.2.12

### **1.2 Network Compatibility**

#### **Potential Effect**

- Proposed highway will reduce volumes and improve operations on existing road network; undertaking is compatible with future road network which will further improve operations as network is upgraded.

#### **Proposed Mitigation/Commitments to Future Work**

- Monitor traffic volumes on road network; stage construction to meet traffic warrants.

#### **Concerned Group/Agency**

- Municipalities, Public

#### **Section Reference**

- 5.2.8 and 5.2.12

### **1.3 Cost**

#### **Potential Effect**

- Proposed undertaking estimated to cost approximately \$222 million;

#### **Proposed Mitigation/Commitments to Future Work**

- During design, examine opportunities for cost efficiency without increasing impacts.

#### **Concerned Group/Agency**

- MTO, Public

#### **Section Reference**

- 5.2.13

## **ENVIRONMENTAL ISSUES AND COMMITMENTS**



## 2.0 Socio-Economic Environment

### 2.1 Property Impacts

#### Potential Effect

- Displacement and disruption of private property, residences and agricultural operations.

#### Proposed Mitigation/Commitments to Future Work

- Property impacts compensated at fair market value; consider advance purchases for those property owners which qualify.

#### Concerned Group/Agency

- Public

#### Section Reference

- 5.2.6 and 5.4.3.1

### 2.2 Community Mobility

#### Potential Effect

- Individuals may experience out-of-way travels as a result of highway crossing existing roads.

#### Proposed Mitigation/Commitments to Future Work

- Grade separations will be constructed at most roads. Four roads are planned to be closed. These roads are discontinuous and carry low volumes.

#### Concerned Group/Agency

- Municipalities, Public

#### Section Reference

- 5.2.4

### 2.3 Recreational Trails

#### Potential Effect

- Severance of existing trails

#### Proposed Mitigation/Commitments to Future Work

- During design opportunities for accommodating a trail under the Black River Crossing will be examined.
- Consultation with local snowmobile clubs will occur during design

#### Concerned Group/Agency

- Snowmobile Clubs, Public

#### Section Reference

- 5.4.3.1

### 2.4 Noise

#### Potential Effect

- Increased Noise.

#### Proposed Mitigation/Commitments to Future Work

- Detailed noise studies will be carried out during the design phase and appropriate mitigation measures will be determined.

#### Concerned Group/Agency

- MOEE, Municipalities, Public

#### Section Reference

- 5.4.3.2

## ENVIRONMENTAL ISSUES AND COMMITMENTS

## 2.0 Socio-Economic Environment (cont'd)

### 2.5 Commercial Displacement

#### Potential Effect

- Displacement of Quinn's Marine existing showroom and part of waterfront access.
- Displacement of Boadway drilling

#### Proposed Mitigation/Commitments to Future Work

- Consult with Quinn's Marine during the design phase to minimize impacts to the business (i.e. identify surplus land, relocate docking space, etc.)
- Business impacts compensated at fair market value.

#### Concerned Group/Agency

- Business Owners

#### Section Reference

- 5.4.4.2

### 2.6 Agricultural Impacts

#### Potential Effect

- Loss of prime Agricultural Land.
- Impacts to farm vehicle movement.
- Impacts to tile drainage system.
- Dust (during construction) and salt spray impacts to tender fruits and vegetables planted on agricultural lands in proximity to the new facility.

#### Proposed Mitigation/Commitments to Future Work

- Impact reduced through planning. Opportunities for further reduction will be considered during detail design.
- Grade separations have been provided at most road crossings to allow for farm vehicle movement across the highway.
- Consultation with affected farm owners will occur during design to assess tile drainage impacts. Measures will be implemented to ensure that tile drainage systems are not detrimentally impacted.
- Continue to research and test alternative deicing materials and methods.
- Include dust control provisions in construction contracts.

#### Concerned Group/Agency

- OMAFRA, Farm Operators

#### Section Reference

- 5.4.4.1

### 2.7 Contaminated Sites

#### Potential Effect

- Excavation of contaminated soils

#### Proposed Mitigation/Commitments to Future Work

- MOEE will be contacted for assistance in handling and disposal of contaminated soils.

#### Concerned Group/Agency

- MOEE, Municipalities, Public

#### Section Reference

- 5.4.4.3

## ENVIRONMENTAL ISSUES AND COMMITMENTS



### 3.0 Natural Environment

#### General Commitment

At the outset of the design phase, the proponent will meet with MNR, LSRCA, and DFO staff to discuss concerns, review and update their workplan to current standards, policies, regulations, and approval requirements, and obtain any new information which may be applicable to the design phase. This will include an assessment of the federal Canadian Environmental Assessment Act requirements and any additional work necessary to finalize and implement the design for the undertaking.

Prior to implementation, the proponent will identify design and construction details for the undertaking. This will include identification of the schedule, the construction activities, the impact of these activities upon adjacent lands or watercourses, and the mitigation which will be employed to minimize the impacts. The details of the construction activities will include the location of storage areas, equipment maintenance areas, dewatering areas, and access requirements.

Appropriate mitigation will be developed by the proponent during the design phase and will be reviewed with MNR, LSRCA, and the federal agencies to address their concerns and legislative requirements prior to implementation. The following sections identify specific commitments to provide appropriate mitigation for the impacts resulting from the undertaking. Appropriate refers to mitigation that is both practical and reasonable given the site conditions and the degree of impact. Appropriate also recognizes and accepts that the mitigation for one factor may result in additional impacts to another factor. For example, the installation of fencing below grade to discourage wildlife movement will cause some disturbance to vegetation.

### 3.1 Fisheries and Aquatic Habitat

#### Potential Effect

- Specific impacts and mitigation measures for individual crossings are listed in Exhibit 5.6.
- Specific fisheries mitigation measures are not required for 27 of the crossings along the technically preferred route with no fish habitat as there will be no impacts from the highway. Standard measures that address environmental protection and site restoration at the construction phase would still be applied.
- For the majority of crossing that sustain a low impact from the highway, mitigation measures include the installation of culverts to maintain fish passage opportunities and the conveyance of flow. As mentioned previously, it is anticipated that bridged crossings will not have piers placed within the channel resulting in a low impact, although that possibility exists for the crossing of Pfefferlaw Brook. This design will require confirmation at the design stage.
- Fisheries mitigation measures for those crossings that will have a moderate impact from the highway are not feasible. These are crossings of dug ponds where the habitat will be lost through filling. Since these ponds are artificial and on private land, and there exists the opportunity for the landowners to remove them at their own discretion, we have not considered their loss to be a harmful alteration and compensation would not be required for their loss.
- For the five crossings that sustain moderate to high impacts, mitigation measures include the installation of culverts to maintain fish migration and low flow channel form. Where beneficial, natural substrate be incorporated into the culvert bottom to maintain spawning or feeding opportunities. Federal authorization under the Fisheries Act will likely be required for the alterations to the habitats at crossings noted on Exhibit 5.6, but this will be confirmed at the design stage.
- For the four crossings that will have a high impact from the construction of Highway 404, mitigation measures include the installation of open bottom culverts to maintain groundwater discharge potential, substrates, fish passage, feeding habitat and low flows. Compensation will likely be required for the loss or alteration of habitats including potential spawning habitat for pickerel, low lying, grassy areas suitable for pike spawning as well as refuge habitat (undercut banks and overhanging vegetation) but specific requirements would be confirmed at the design stage.

## ENVIRONMENTAL ISSUES AND COMMITMENTS

### 3.0 Natural Environment (cont'd)

#### 3.1 Fisheries and Aquatic Habitat (cont'd)

##### Proposed Mitigation/Commitments to Future Work

Mitigation will include the following commitments wherever appropriate:

- bridge and culvert designs that:
  - maintain the existing channel form or include a low flow channel where appropriate;
  - do not impede fish movement;
  - do not place piers within the channel as defined by bankfull flow conditions, or are oriented in the direction of water flow to maximize hydraulic efficiency during high flow conditions;
  - minimize erosion and flood risk upstream and downstream of structure;
  - utilize open bottomed culverts in upwelling areas.
- plans that maximize the riparian vegetation protection and the re-establishment as soon as possible after disturbance;
- plans that minimize the disruption to natural systems and maintain slope stability when developing access roads for construction, including re-establishment or stabilization after construction;
- plans that provide for watercourse realignments in dry;
- timing constraints to restrict construction activities immediately adjacent to or within watercourses to low flow months and that avoid sensitive spawning periods;
- contract specifications that require the preparation of sedimentation and erosion control plans, which provide details of implementation, monitoring, and commitment to undertake modifications where necessary during construction to maintain effectiveness.

##### Concerned Group/Agency

- MNR, DFO, LSRCA, Municipalities, Interest Groups, Public

##### Section Reference

- 5.4.2.1 and Exhibit 5.6

#### 3.2 Vegetation

##### Potential Effect

- Specific impacts and mitigation measures for individual features are listed in Exhibit 5.7.
- Encroachment: where a woodlot or wetland lies within 100 m of the ROW but none of the vegetation is actually removed. Impacts relate to the effect of noise, fumes, and runoff on the natural vegetation.
- Edge Effects: the ROW removes edge of a woodlot, reducing the overall patch size but still keeping the remaining portion as a single unit. Opening the edge of the patch permits secondary injury to the remaining vegetation, and also permits the invasion of exotic species which reduces the quality of the native plant community.
- Fragmentation: the ROW passes through the interior of a woodlot or wetland leaving patches that are separated by the ROW, but large enough to function as intact communities. Removing the same area of vegetation from the interior of a woodlot as compared to removing an edge is potentially a much greater impact because two new edges are created, and the potential for interior habitat important to area-sensitive species is reduced. In addition, road mortality for wildlife may be higher due to isolated wildlife populations trying to cross the road.
- Total removal of a feature: the entire woodlot or wetland is removed by the highway.
- Break in Wildlife Corridor: the highway crosses a linear belt of vegetation (e.g., valley) which is used as a movement route by wildlife. The highway creates a dispersal barrier for some species or causes high road mortality for others.

## ENVIRONMENTAL ISSUES AND COMMITMENTS



### 3.0 Natural Environment (cont'd)

#### 3.2 Vegetation (cont'd)

##### Potential Effect (cont'd)

- Removal of portions of an existing woodlot may result in physical impacts to the portion of the woodlot which remains. Sunscald, and windthrow may cause dieback along the edge resulting in treefalls and a tangled understorey comprised of invasive species. This is most pronounced where new edges have a south or west facing exposure. The amount of dieback is dependent on age of the stand (older ones are more sensitive), species composition and the soil moisture.

##### Proposed Mitigation/Commitments to Future Work

Mitigation will include the following commitments wherever appropriate:

- edge management plans for areas of new disturbance to protect remaining trees and re-establish edge;
- salvage of existing native vegetation, seed, and topsoil for re-establishment in identified areas of significant disturbance;
- relocation of rare, threatened or endangered plant species;
- minimization of disturbance to remaining vegetation by felling trees into the working easement, and leaving stumps and roots for soil stabilization and natural regeneration, and restricting access with fencing to working areas;
- maximize forest regeneration opportunities on lands which are surplus to transportation needs as mitigation for fragmentation of significant vegetation and to provide linkage to alternate habitat.

##### Concerned Group/Agency

- MNR, LSRCA, Municipalities, Interest Groups, Public

##### Section Reference

- 5.4.2.2 and Exhibit 5.7

#### 3.3 Wetlands

##### Potential Effect

- Specific impacts and mitigation measures for individual features are listed in Exhibit 5.7.
- Encroachment: where wetland lies within 100 m of the ROW but none of the vegetation is actually removed. Impacts relate to the effect of noise, fumes, and runoff on the natural vegetation.
- Edge Effects: the ROW removes edge of a wetland, reducing the overall patch size but still keeping the remaining portion as a single unit. Opening the edge of the patch permits secondary injury to the remaining vegetation as outlined below, and also permits the invasion of exotic species which reduces the quality of the native plant community.
- Fragmentation: the ROW passes through the interior of a wetland leaving patches that are separated by the ROW, but large enough to function as intact communities. Removing the same area of vegetation from the interior as compared to removing an edge is potentially a much greater impact because two new edges are created, and the potential for interior habitat important to area-sensitive species is reduced. In addition, road mortality for wildlife may be higher due to isolated wildlife populations trying to cross the road.
- Break in Wildlife Corridor: the highway crosses a linear belt of vegetation (e.g., valley) which is used as a movement route by wildlife. The highway creates a dispersal barrier for some species or causes high road mortality for others.
- Disruption of the hydrological regime: excavation of organics and filling along the highway footprint can result in blockage of flow creating wetter conditions on one side and drier on the other. Both of these extremes will induce a change in the nature of the wetland.

## ENVIRONMENTAL ISSUES AND COMMITMENTS

### 3.0 Natural Environment (cont'd)

#### 3.3 Wetlands (cont'd)

##### Proposed Mitigation/Commitments to Future Work

Mitigation will include the following commitments wherever appropriate:

- installation of equalizer culverts to preserve dynamics of wetland hydrology by maintaining sheet flow through the wetland and facilitating wildlife crossing for small mammals and amphibians;
- delineation of areas to be protected with sediment fences to prevent intrusion during construction;
- timing constraints that restrict construction activities immediately adjacent to or within wetlands to respect the intent of the federal Migratory Bird Regulations (1994) and Ontario Game and Fish Act (1980);
- contract specifications that require the preparation of sedimentation and erosion control plans, which provide details of implementation, monitoring, and commitment to undertake modifications where necessary during construction to maintain effectiveness;
- salvage of wetland plant material to be used for re-establishment in identified areas of significant disturbance;
- minimization of dewatering within wetlands and irrigation to maximize survival in disturbed areas that will be re-established;
- retention of lands which are surplus to transportation needs for the purpose of mitigation by allowing reversion to wetland.

##### Concerned Group/Agency

- MNR, DFO, LSRCA, Municipalities, Interest Groups, Public

##### Section Reference

- 5.4.2.3 and Exhibit 5.7

#### 3.4 Wildlife

##### Potential Effect

- Specific impacts and mitigation measures for individual features are listed in Exhibit 5.7.
- The loss of natural areas represents a loss of potential breeding and foraging areas for resident wildlife, as well as migratory stopovers for migrant birds.
- General noise, air pollution and contaminated runoff as a result of encroachment of the highway as well as crossings;
- Disturbance during critical phases of breeding;
- Barriers to wildlife movement along linear corridors such as river valleys, and connected habitat over the tableland, or between differing habitat required at critical stages of the life cycle (e.g., red-spotted newts require both water to breed, and upland for the juvenile stage), and;
- Loss of habitat (breeding, forage, shelter).

##### Proposed Mitigation/Commitments to Future Work

Mitigation will include the following commitments wherever appropriate:

- bridge and culvert designs that accommodate terrestrial passage for small mammals at identified locations within specified wildlife corridors.
- at the Vachell crossing, highway design that remains elevated and permits the installation of a large box culvert with an effective opening (2m X 3m) to maintain wildlife corridor connectivity and which recognizes wildlife requirements for light and a terrestrial base, and facilitates water movement. Other culverts to be installed every 100 m or less across the forested area associated with the swamp. Identified crossings fenced with chainlink fence installed below grade to discourage small mammals and turtles and to encourage the use of the culverts.

## ENVIRONMENTAL ISSUES AND COMMITMENTS



### 3.0 Natural Environment (cont'd)

#### 3.4 Wildlife (cont'd)

##### Proposed Mitigation/Commitments to Future Work (cont'd)

- at the Morning Glory Swamp oversize and install a culvert with an effective opening (2m high by 4m wide) to maintain wildlife corridor connectivity and which recognizes wildlife requirements for light and a terrestrial base, and facilitates water movement. Other culverts to be installed every 100 m or less across the forested area associated with the swamp. Identified crossings fenced with chainlink fence installed below grade to discourage small mammals and turtles and to encourage the use of the culverts.
- restrict clearing of trees immediately adjacent to or within breeding areas for all wildlife to non-critical periods.

##### Concerned Group/Agency

- MNR, LSRCA, Municipalities, Interest Groups, Public

##### Section Reference

- 5.4.2.4 and Exhibit 5.7

#### 3.5 Groundwater

##### Potential Effect

- Specific impacts and mitigation measures for individual features are listed in Exhibit 5.8.
- Areas of highly permeable soil are considered to be sensitive to groundwater contamination due to the potentially rapid movement of contaminants through these soils. Included in this group of soils are sands and gravels of glaciolacustrine and glaciofluvial origin as well as ice contact stratified drift. Also included in this category are organic deposits such as peat and alluvial stream deposits which contain a mixture of sand, gravel as well as silt and clay.
- Areas of low permeable soil are considered to have low sensitivity. Fine grained silt, clay soils, glacial tills and glaciolacustrine deposits have low permeability and do not allow rapid movement of contaminants through them.

##### Proposed Mitigation/Commitments to Future Work

Mitigation will include the following commitments wherever appropriate:

- tilling of soil in non-vegetated areas prior to restoration to re-establish infiltration along access roads, storage areas, or other well traveled areas where soil compaction has occurred in areas that previously permitted infiltration;
- backfilling of excavations that intercept existing ground water flow with porous granular material to maintain existing ground water linkage particularly at river crossings;
- detailed stormwater management plans which address both quantity and quality;
- a well monitoring program which will involve pre-construction testing, investigation of complaints during construction, and provision of an alternate water supply.
- well abandonment will be carried in compliance with O.Reg 903; decommissioning of septic systems will be carried out in compliance with O.Reg 358 and Regional Health Units will be consulted.

##### Concerned Group/Agency

- MOEE, MNR, LSRCA, Municipalities, Interest Groups, Public

##### Section Reference

- 5.2.7, 5.4.2.5 and Exhibit 5.8

## ENVIRONMENTAL ISSUES AND COMMITMENTS

### 3.0 Natural Environment (cont'd)

#### 3.6 Stormwater Management

##### Potential Effect

- Impacts to water quality and quantity to adjacent watercourses
- Increase in erosion
- Impacts to surface and ground water, including those related to temperature and salt.

##### Proposed Mitigation/Commitments to Future Work

- Roadside ditches and the centre median will be designed to accommodate highway drainage.
- A detailed stormwater management plan will be prepared as part of the design stage. The stormwater management plan will give consideration to the MOEE 1994 Stormwater Management Guideline. The standards, policies, regulations and approval requirements in place at the time of design will govern the stormwater management provisions and approval requirements incorporated in the plan.
- Where feasible, opportunities for providing ease of containment of accident spills will be provided during the design of stormwater facilities.

##### Concerned Group/Agency

- MOEE, MNR, LSRCA, DFO

##### Section Reference

- 5.2.7

### 4.0 Cultural Environment

#### 4.1 Heritage

##### Potential Effect

- Displacement of built heritage features and cultural landscapes.
- Disruption of built heritage features and cultural landscapes through isolation, and introduction of visual, audible or atmospheric elements.

##### Proposed Mitigation/Commitments to Future Work

- Historical and architectural research will be undertaken to further assess the heritage value and significance; documentation will be undertaken in advance of demolition or relocation and agreement on any further mitigation measures agreed to with affected parties or reviewing agencies.
- Mitigation measures to ameliorate adverse impacts to affected roadscapes either through closure, interchange, bridge or underpass construction may include, where appropriate:
  - retention, re-siting and/or replacement in kind of all types of fencing,
  - retention of substantial deciduous hedgerows associated with affected roadscapes,
  - new ditching to be planted with grass and or marsh plantings.
- Retain a qualified heritage consultant to assess the heritage significance of any newly discovered heritage resources and recommend appropriate mitigation measures.

##### Concerned Group/Agency

- MCzCR, Municipalities, Interest Groups, Public

##### Section Reference

- 5.4.5.2

## ENVIRONMENTAL ISSUES AND COMMITMENTS



## 4.0 Cultural Environment (Cont'd)

### 4.2 Archaeology

#### Potential Effect

- Destruction of archaeological remains.

#### Proposed Mitigation/Commitments to Future Work

Mitigation will include the following commitments:

- A full-coverage archaeological assessment of the proposed right-of-way will be undertaken as early as possible during design to identify significant archaeological sites.
- Mitigation of significant archaeological remains will include:
  - avoidance (where appropriate) of cemetery sites, Iroquoian village sites and associated cemeteries/ossuaries and Paleo-Indian sites.
  - salvage excavation

#### Concerned Group/Agency

- First Nations, MCzCR, Municipalities, Interest Groups, Public

#### Section Reference

- 5.4.5.1

## ENVIRONMENTAL ISSUES AND COMMITMENTS





Main  
Report

# **HIGHWAY 404 EXTENSION**

Davis Drive (York Regional Rd. 31)  
to Highway 12

**Route Planning Study and  
Environmental Assessment**

**Central Region  
W.P. 299-86-00**

Prepared by:

**COLE, SHERMAN & ASSOCIATES LTD.**

December, 1997





## P R E F A C E

This Environmental Assessment Report documents an Environmental Assessment Study undertaken by the Ministry of Transportation for the extension of Highway 404 from Davis Drive to Highway 12.

The initial problem statement developed for this project was based on the findings of the Highway 89 Overview Study completed by MTO in 1989. The Highway 89 study looked at connecting Highways 400, 404 and 7 to address the issues of out-of-way travel, inefficient movement and highway network continuity for east-west travel across northern York and Durham Regions.

In the summer of 1993, the Office of the Greater Toronto Area (OGTA) released population and employment projections to year 2021 for south-central Ontario, including northern York and Durham Regions. As well, York Region published its first Official Plan, reflecting the Region's development policies and aspirations to year 2021. When this information was used to forecast travel demand in northern York and Durham Regions, the transportation problems were significantly different and much more quantifiable than those originally presented.

The need for the extension of Highway 404 is to serve future long distance commuter traffic (up to the 2021 horizon year) traveling between the northern areas of York and Durham Regions, and southern York Region/ Metro Toronto.

This study followed a consultation process which included external agency, municipal staff and council reviews, and public consultation through information centres at each phase of the study. The study also incorporated additional workshops, presentations and meetings with interested individuals to identify and address concerns.

In addition to this study, three road projects which connect to the proposed Highway 404 extension are currently in progress.

*Green Lane/Herald Road Corridor Improvements Study* by York Region incorporates an interchange with Herald Road and Highway 404. The interchange has been designed to accommodate the proposed improved Herald Road. In addition, the profile and grading of Highway 404 between Davis Drive and Herald Road reflect the requirements for the Herald Road improvements.

The *Highway 400-Highway 404 Extension Link (Bradford Bypass) Study* by MTO incorporates an east-west controlled access highway connecting Highway 400 and Highway 404, including an interchange with Highway 404 north of Queensville. The two projects are compatible in that they are both freeway facilities connected by an fully directional interchange.

The *Highway 12/48 Improvements Study* by MTO is developing corridor improvements for Highway 12/48 to address the short- to mid-term operational needs. Alternatives being considered include widening Highway 12/48 to four lanes. Both studies were coordinated to ensure compatible cross-sections.

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## RELATED STUDIES

*The following studies were prepared over the course of this project to provide specific information which guided the study process and/or served as inputs to decision-making. Copies of these reports were made available to the public and agencies during the study, and are available for review, upon request, at MTO and libraries in the study area.*

Environmental Assessment Proposal  
Transportation and Utilities Technical Report  
Natural Environment Technical Report  
Social-Economic Environment Technical Report  
Cultural Environment Technical Report











## **1.0 OVERVIEW OF UNDERTAKING AND APPROVALS BEING SOUGHT**

### **1.1 PURPOSE OF THE UNDERTAKING**

This Environmental Assessment Report - One-Stage Submission has been prepared by the Ontario Ministry of Transportation (MTO) to obtain approval under the Environmental Assessment Act (EA Act) to extend Highway 404 from Davis Drive (York Regional Road 31) northerly to Highway 12.

The purpose of the undertaking is to resolve a deficiency in the capacity of the transportation network in northern York and Durham Regions to accommodate forecasted commuter and recreational travel needs. The study also addresses the opportunity to identify a plan which resolves this problem and allows for the protection of the Ministry of Transportation's long-term strategic goals for the movement of people and goods through northern York and Durham Regions, given the diminishing opportunity to protect for the long-term transportation needs in a cost-effective, non-disruptive manner. A more detailed discussion of the Problem/Opportunity Statement is presented in Chapter 3.

In light of the problem and opportunity present in northern York and Durham Regions, the objectives of this study are:

- To identify a preferred alternative to address the transportation problems and opportunity;
- To incorporate consultation with the public and with any interested or affected agencies/organizations throughout the planning process;
- To identify a preferred alternative that has acceptable/mitigatable effects on the natural/social/economic/cultural environment and which can be implemented at an acceptable cost; and,
- To prepare a concept design for those aspects of any transportation improvements that may be associated with the preferred alternative which fall within the jurisdiction of the MTO.

The study area for this project is shown in Exhibit 1.1.

### **1.2 SUMMARY DESCRIPTION OF THE UNDERTAKING**

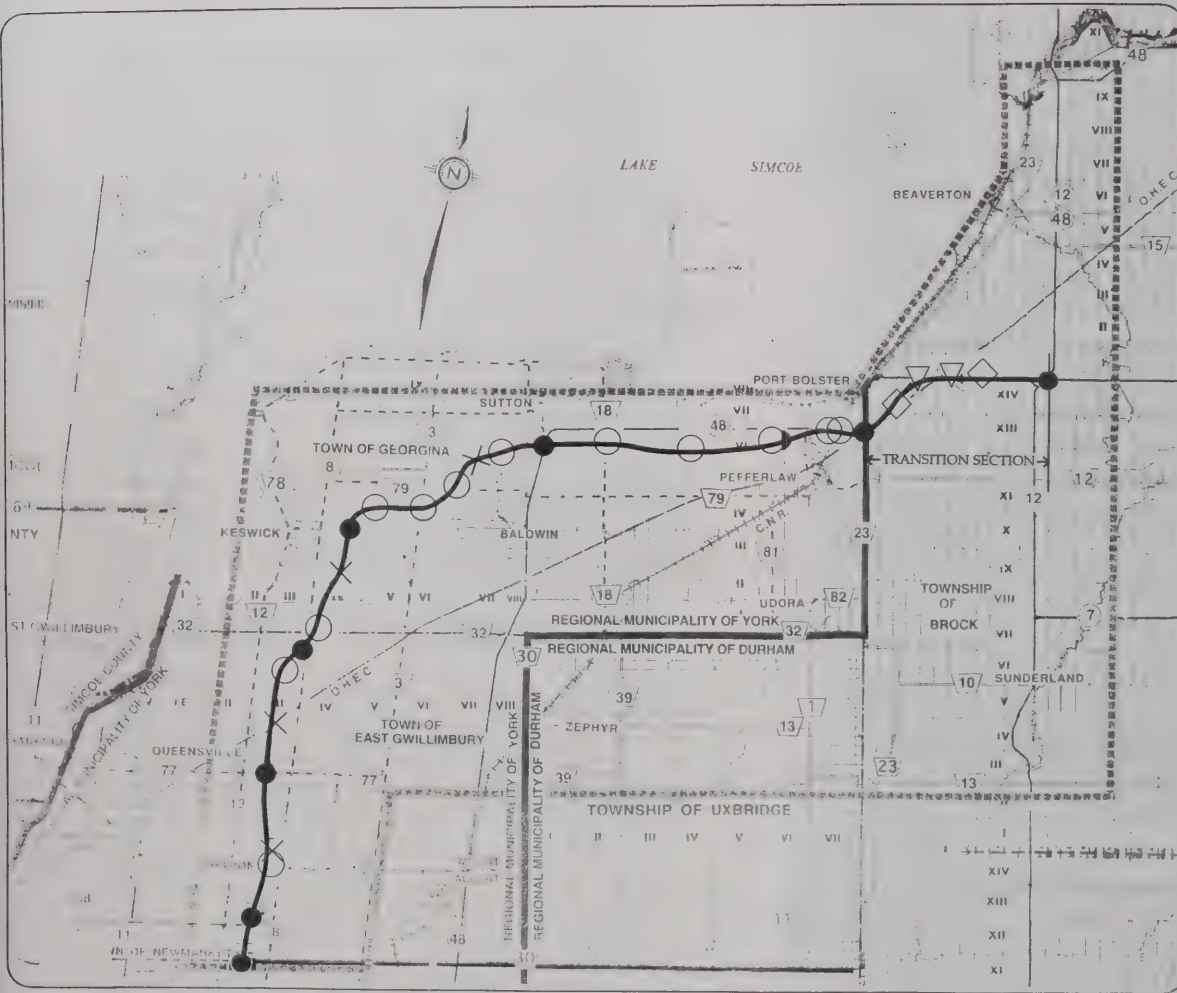
The proposed undertaking consists of approximately 45 kilometres of new four-lane divided highway with controlled access extending northerly from Davis Drive to Durham Road 23, and a 9 kilometre transition section between Durham Road 23 and Highway 12 (refer to Exhibit 1.2).

The four-lane highway will feature two lanes of traffic per direction, separated by a 30 metre wide median within a basic minimum right-of-way of 100 metres (the width of the median and right-of-way is reduced through the Pefferlaw area). The "controlled access" designation will restrict direct access to the highway to interchange locations.

The transition section will consist of a four-lane divided highway with limited access (right in; right out). The transition section will be constructed with two lanes per direction by twinning existing Highway 48. The existing Highway 48 right-of-way will be widened to accommodate a grass median and intersections at Brock Concession Road 14 and Brock Sideroad 17. The existing intersection of Highway 48 and Highway 12 will be upgraded to an interchange. In addition, the highway right-of-way in the transition section will be designated "special controlled access". Under this designation, no new entrances to the



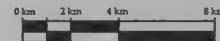
## STUDY AREA



## THE UNDERTAKING

### LEGEND

|                                  |            |
|----------------------------------|------------|
| STUDY AREA LIMIT                 | ■■■■■■■■■■ |
| INTERCHANGE                      | FULL ●     |
| LOCATIONS                        | PARTIAL ◐  |
| GRADE SEPARATION                 | ○          |
| ROAD CLOSING                     | ×          |
| AT GRADE INTERSECTION            | ◇          |
| RIGHT IN, RIGHT OUT INTERSECTION | ▽          |



## HIGHWAY 404 EXTENSION

Davis Drive to Highway 12

Route Planning Study and  
Environmental Assessment





highway will be permitted, and conversion of existing entrances (i.e. from field entrance to residential entrance) will be subject to review by MTO.

Nine interchanges are proposed, including full interchanges at Herald Road, Queensville Sideroad, Woodbine Avenue, Pollock Road, Highway 48, Durham Road 23 and Highway 12. The existing partial interchange at Davis Drive will be upgraded to a full interchange, and a partial interchange at realigned Pepperlaw Road will be constructed.

On the transition section, the median at the at-grade intersections at Brock Concession Road 14 and Brock Sideroad 17 will widen from 15 metres to 30 metres in width, to provide refuge for turning vehicles. The right-of-way for the transition section will be 60 metres wide, flaring to 80 metres at these intersections. The intersection of Highways 12 and 48 will be upgraded to an interchange which will provide a direct connection from the transition section to Highway 12/48.

Property beyond the basic minimum right-of-way widths for the undertaking may be required for associated features, which may include, but are not limited to: stormwater management facilities, temporary construction easements, mitigation/compensation measures and access roads.

### **1.2.1 SUMMARY OF NET ENVIRONMENTAL EFFECTS OF THE UNDERTAKING**

The following summarizes the net environmental effects associated with the undertaking. For more details of site specific impacts and proposed mitigation, refer to Sections 5.4 and 5.6.

#### **1.2.1.1 Transportation**

##### **Traffic Operations**

The proposed extension will improve efficiency for long-distance travel through the study area. The facility will provide for high-speed non-stop travel on a continuous facility. The new facility will also increase roadway capacity to sufficiently accommodate daily traffic demand, as well as seasonal peaks, temporary traffic reductions, peak recreational traffic demand and diverted traffic from congested alternate routes.

To be effective in improving transportation efficiency, the extension must be implemented in accordance with traffic demand. Traffic volumes will continue to be monitored on existing provincial and municipal roads. Staging for the new facility will be considered once approval for the Undertaking is received.

##### **Network Compatibility**

The proposed extension of Highway 404 will greatly improve traffic operations on much of the study area road network. By diverting the long-distance traffic from the municipal road network, traffic operations on these roads will be improved. Grade separations at most of the crossing roads will reduce impacts to the local road network.

The proposed facility will extend the existing provincial freeway system serving south-central Ontario. In addition, the Highway 404 extension is compatible with the future study area road network which, once implemented, will further improve operations in and around the study area.

To be effective in improving operations on the road network, the extension must be implemented in accordance with traffic demand. Traffic volumes will continue to be monitored on existing provincial and municipal roads. Staging for the new facility will be considered once approval for the Undertaking is received.

## **Cost**

The estimated cost of the new facility will be amortized over many years. Construction can be staged so as to further spread these costs over several years. In return, this infrastructure project will generate jobs during construction and produce travel time savings and other economic benefits for many years thereafter.

During the next design phase, options for cost-efficiencies through design improvements will be investigated. The cost-effective designs should satisfy the transportation needs of the Highway 404 extension and consider the full range of impacts.

### **1.2.1.2 Natural Environment**

#### **Fisheries**

MTO has developed a set of standard mitigation and design practices which address many of the impacts of highway development. When applied appropriately and maintained, they can effectively reduce or eliminate the impact.

The preferred route crosses 66 watercourses; twenty-seven of the 66 crossings are not considered fish habitat and would, therefore, not be impacted by the preferred route of Highway 404.

Of the remaining 49 crossings, the highway will have a high impact on four crossings. These channels are considered to provide permanent feeding and refugia habitat, migratory routes and potential spawning habitat for top predator species such as northern pike (*Esox lucius*), smallmouth bass and yellow perch. The impacts include the loss of pike spawning habitat and alterations to other habitat functions such as feeding and refugia.

Five of the crossings, four streams and one pond, will sustain moderate-high impacts from the construction of the highway. The habitat in the channels provides feeding and refugia habitat for minnow species and possibly seasonal spawning habitat.

Three small artificial ponds will have a moderate impact from the highway. These ponds will be filled in so that their flow contributions to the adjacent channels will be severed. The impacts to these ponds are not assessed as harmful alterations since the ponds are artificial and are not sustainable over the long term without management.

The highway is considered to have a low impact on 26 crossings. Five of the crossings are large channels associated with the Black and Maskinonge Rivers and Pefferlaw Brook, that will be bridged. Twelve of these crossings are drainage channels connecting wetlands through equalizer culverts under Highway 48. The remaining nine crossings included in this category are the seasonal channels that have flow in the spring and early summer conveying surface drainage.

#### **Vegetation**

Through the route generation and selection process, most of the environmentally significant sites (mostly wetlands) in the study area were avoided.



The remaining vegetation along the route is largely upland, and under agricultural use. Where areas of natural vegetation occur, they are, in a few cases, farm woodlots, but more often areas of marsh and swamp where the high water table made farming not practical.

Approximately 125 ha. of natural vegetation will be removed on approximately 24% of the land area of the entire ROW. Almost two-thirds of this area is wetland, while the remaining third is composed of upland woodlots.

### **Wetlands**

Of the 34 evaluated wetlands in the study area, the proposed Highway 404 extension crosses six:

- Maskinonge Wetland
- Sod Swamp
- Vachell Swamp
- Morning Glory Swamp
- Port Bolster Swamp (existing Highway 48 crossing)
- Gibson Hill Swamp (existing Highway 48 crossing)

Approximately 78 ha of wetland vegetation will be removed with construction of the highway. The wetland crossings are fewer in number than woodlot crossings and are generally large. They are concentrated in the Maskinonge Swamp area south of Keswick, and the Vachell Swamp area southeast of Sutton.

### **Wildlife**

South of Lake Simcoe, the route crosses six locally significant wildlife corridors, three of which connect to regional systems:

- Maskinonge River Corridor
- Black River to Sod Swamp Corridor
- Black River Corridor (regional)
- Mossington Park - Vachell Corridor
- Morning Glory Swamp Corridor (regional)
- Pefferlaw Brook Corridor (regional).

At the Maskinonge, Black River and Pefferlaw Brook, the proposed bridge spans provide opportunity for terrestrial passage for mammals, birds and other wildlife.

In general, high quality habitat has been avoided, and therefore wildlife impacts tend to be low to moderate.

### **Groundwater**

The proposed highway will impact approximately 160 wells situated in soils with high hydrogeological sensitivity, and approximately 70 wells in soils with low sensitivity. The construction and maintenance of the highway will be undertaken in such a manner that the potential for adverse affects will be minimized.

#### **1.2.1.3 Social Environment**

##### **Community Effects**

Through the avoidance of major urban areas during the corridor development stage, the preferred route avoided many of the intensely developed areas. The preferred route impacts 225 properties between Davis Drive and Highway 12, including 48 residences which are potentially displaced. These residences are primarily individual farmsteads, although there

are residential clusters impacted, particularly in the vicinity of proposed interchange locations and grade separations.

Property impacts will be mitigated by providing fair market value for lands and buildings displaced by the proposed highway. For disrupted properties, compensation will be negotiated based on loss of use of the portion of property required for the new highway.

## Noise

With the implementation of the undertaking, several residences may experience a noise increase greater than 5 dB, and may experience resultant noise levels greater than 55 dBA.

Since siting the highway avoided as many built-up areas as possible, the majority of noise impacts affect single homesteads with little opportunity for mitigation.

Clustered increases include:

- Proposed Pollock Estates Subdivision at Pollock Road (12 receivers potentially impacted)
- Elm Grove Trailer Park near Catering Road (34 receivers potentially impacted)
- Green Acres Trailer Park east of Pefferlaw (28 receivers potentially impacted); and
- Summer Breeze Trailer Park north of Brock Concession Road 14 (24 receivers potentially impacted).

### 1.2.1.4 Economic Environment

#### Agriculture

In terms of area, agriculture is the land use most affected by the undertaking (approximately 700 ha. affected in total). The majority of the impacts to agricultural operations involve minor (less than 25% of total farm area) land taking, which do not impact the viability or operations of the farm.

The undertaking will displace approximately 410 ha of productive soils, including 228 ha of Class 1-2 soils and 98 ha of Class 3-4 soils, 32 ha of Class 5-7 soils and 52 ha of organic soils. This displacement is a permanent loss of this resource.

The undertaking displaces or otherwise disrupts the operations of 37 agricultural operations. Ten operations are displaced, which include two beef operations, three cash crop operations, one greenhouse, one horse farm two pasture/forage farms and one abandoned farm. In addition, twenty-seven operations are disrupted, including three specialty crop operations, seven beef operations, twelve cash crop operations, two dairy operations, one swine operation, one greenhouse and one horse farm.

On the basis of level of capital investment, which considers the size and condition of the farm complex, no high value operations are displaced, while three are disrupted; one medium value operation is displaced and two are disrupted; nine low value operations are displaced, while twenty-two are disrupted.

The total area of agricultural use impacted by the preferred route represents approximately 5% of the current agricultural production area in East Gwillimbury, Georgina and Brock. The impacts to the agricultural operations will therefore not significantly affect the local agricultural economy in northern York and Durham Regions.

## **Commercial/Industrial**

Two major business uses are directly impacted by the preferred route, Boadway Drilling and Quinn's Marine. The drilling company will be relocated while refinements have been implemented to reduce the property impacts to the marina business.

### **1.2.1.5 Cultural Environment**

#### **Archaeology**

Archaeological site data were collected from three sources: Ministry of Citizenship, Culture and Recreation (MCzCR) site database, a heritage workshop, and field visits and interviews with certain residents of the study area subsequent to the heritage workshop. According to the archaeological database of MCzCR, there are 107 registered and seven unregistered archaeological sites in the study area. Selection of the preferred route attempted to minimize impacts to known sites and to lands with moderate to high archaeological potential, namely the Lake Algonquin beach ridge and upland areas.

Only one known archaeological site may be impacted by the preferred route. It is the Lindensmith site (BbGu-8), located east of the proposed right-of-way south of Glenwoods Avenue. It is a Paleo-Indian site and will require salvage excavation if updated survey places it within the right-of-way. Four highly significant sites (Deavitt, Udora, Uxbridge Ossuary and Harshaw Village) in the study area will not be impacted by the preferred route. In addition, no known cemetery will be impacted.

The inventory of registered sites is based on relatively limited field assessments by research and consulting archaeologists; some site information, particularly degree of site disturbance and precise location, may be inaccurate. Less than one percent of the preferred route has been subjected to licensed archaeological investigation. For these reasons, a full-coverage archaeological assessment (according to MCzCR Technical Guidelines for Stage 1-3 Archaeological Assessments (1993)) of the proposed right-of-way will be undertaken as early as possible during design to identify significant archaeological sites. Newly discovered, highly-significant sites within the proposed right-of-way (e.g. Huron ossuary or village) will be avoided if possible, highway design permitting. Significant sites that cannot be avoided will be salvage excavated prior to construction.

#### **Heritage**

Within the right-of-way there are twelve (12) built heritage features that have the potential to be displaced. These comprise two outbuildings, (one of log construction), four residences (three of pre-1900 and one post 1900 construction), two silos, two barns, one barn foundation and an unidentified structure. These features are considered to be typical, vernacular structures, generally of a rural character, none of which are of unique or exceptional heritage significance.

There are also eight (8) cultural landscapes located within the right-of-way (all roadscape) that have the potential to be displaced. All are considered to be typical and representative features of the rural landscape, none of which are of unique or exceptional heritage significance. Accordingly, the proposed route is considered to entail minimal losses of, and few adverse impacts to, cultural heritage resources.

As noted previously, details of site specific impacts and proposed mitigation are presented in Sections 5.4 and 5.6.



### 1.3 ENVIRONMENTAL ASSESSMENT APPROVALS BEING SOUGHT

This report documents the Environmental Assessment (EA) process followed per the EA Act, RSO 1990. The Act was amended in 1997 and incorporated a transition provision for those submissions made by the end of 1997 to be processed under the regulatory requirements of the earlier Act. Having completed this study prior to the end of 1997, MTO is submitting the Highway 404 Extension EA Report under the transition provisions of the 1997 Act. MTO has also requested to have Part II of the previous EA Act, and the provisions of Part II of the new Act with respect to mediation, if these are required, and the Section 12.2 activities permitted before approval, to apply to this EA.

The undertaking for which approvals are being sought consists of approximately 45 kilometres of new four-lane divided highway with controlled access extending northerly from Davis Drive to Durham Road 23, a 9 kilometre transition section between Durham Road 23 to Highway 12, and associated features. The project is located in York and Durham Regional Municipalities.

In accordance with the requirements of the EA Act, this submission consists of the following:

- a discussion of the purpose of the undertaking (refer to Section 3.1 - Problem/Opportunity Statement)
- a description of the undertaking (refer to Section 1.2 - Summary Description of the Undertaking, and Chapter 5 - Detailed Description of the Undertaking)
- rationale for the undertaking (refer to Chapter 3 - Transportation Needs Assessment, and Chapter 4 - Corridor Planning and Route Planning)
- description of and rationale for alternative methods (refer to Section 3.4 - Rationale and Description of Alternative Methods)
- description and rationale for alternatives to the undertaking (refer to Section 3.3 - Rationale, Description and Assessment of "Alternatives To")
- description of the environment affected (refer to Section 4.1 - Description of Study Area Constraints, and Section 5.4 - Environmental Issues and Commitments)
- description of the environmental effects (refer to Chapter 5 - Detailed Description of the Undertaking)
- a discussion of actions to change or mitigate environmental effects (refer to Sections 5.3 - Stakeholder Discussion During Design, 5.4 - Environmental Issues and Commitments, 5.5 - Process for Addressing New Concerns, and 5.6 - Summary of Environmental Effects, Proposed Mitigation, Commitments to Further Work).

If this Environmental Assessment is approved, the Ministry of Transportation will then be in a position to:

- make refinements to the alignment and right-of-way during the design phase.
- designate right-of-way and thus protect a right-of-way for the eventual implementation of the recommended transportation improvement identified in Section 1.2;
- acquire the property needed to build the facility and associated features, which may include, but are not limited to: stormwater management facilities, temporary construction easements, mitigation/compensation measures and access roads.
- proceed with the pre-design, final design and contract preparation for the necessary works;
- carry out construction of the final design in a staged manner;
- operate and maintain the completed highway; and,
- initiate a process for addressing new concerns.

The ministry has been conducting another study to address short to mid-term operational improvements between the north and south junctions of Highway 12/48. In recognition of the findings of the Highway 404 study, the ministry has modified the Highway 12/48 study to address long-term recreational needs. MTO is therefore suggesting the following condition of approval:

**Construction of the Highway 404 Extension north of Green Lane (Herald Road) may not occur until MTO has secured environmental clearance for the Highway 12/48 Environmental Study Report**

The reason for not applying this condition from Green Lane (Herald Road) southerly is that the Region of York has already secured environmental clearance for the section of Highway 404 from Davis Drive to Green Lane as part of their Green Lane Corridor Study.

**Note: The approval being sought by this EA, and the commitments made in this EA, will apply to and be binding upon the Ministry of Transportation, its agents, successors, transfers and/or assigns, and will be applicable to the design, construction, operation and maintenance of the undertaking.**

## 1.4 CANADIAN ENVIRONMENTAL ASSESSMENT ACT

While this EA must be completed following the requirements of the Ontario EA Act, it must also comply with the requirements of the federal government's Canadian Environmental Assessment Act (CEAA). The following table identifies the "triggers" identified to date under CEAA and their applicability to the undertaking, while the Act is discussed further in Section 5.3.5. Where permits are required, application will be made during the design phase.

It should be noted that as of the time of EA submission, there is no commitment to or definition of a specific year or time frame for design and construction of the Highway 404 extension.

| "Trigger"   | Applicability to the Project  |
|---|---|
| <ul style="list-style-type: none"><li>• Canadian Coast Guard<ul style="list-style-type: none"><li>- under the Navigable Waters Protection Act (NWP)</li></ul></li></ul>   | <ul style="list-style-type: none"><li>• the Pefferlaw Brook is considered to be navigable</li><li>• application for approval under NWP will be made during design for any crossing</li></ul>  |
| <ul style="list-style-type: none"><li>• Canadian Transportation Agency (CTA)<ul style="list-style-type: none"><li>- any railway crossing requiring an authorization under the Railways Act</li></ul></li></ul>  | <ul style="list-style-type: none"><li>• application for the approval of the construction of the CN crossing will be made to the CTA during design</li></ul>   |
| <ul style="list-style-type: none"><li>• Department of Fisheries and Oceans (DFO)<ul style="list-style-type: none"><li>- following a review by the Ontario Ministry of Natural Resources, the project may be referred to the DFO for authorization if there is harmful alteration or destruction of fish habitat</li></ul></li></ul> | <ul style="list-style-type: none"><li>• mitigating measures for potential effects to fish and fish habitat to be reviewed with the Ontario Ministry of Natural Resources, who will determine the need for referral to DFO</li></ul> |
| <ul style="list-style-type: none"><li>• Indian and Northern Affairs Canada<ul style="list-style-type: none"><li>- if project affect First Nation lands</li></ul></li></ul>  | <ul style="list-style-type: none"><li>• no First Nation lands were identified as being affected during the study</li></ul>  |
| <ul style="list-style-type: none"><li>• Federal funding or federal lands involvement</li></ul>  | <ul style="list-style-type: none"><li>• not applicable</li></ul>  |







## **2.0 OUTLINE OF STUDY AND CONSULTATION PROCESSES**

### **2.1 STUDY PROCESS FOR TRANSPORTATION PLANNING AND ROUTE PLANNING**

This environmental assessment study followed a typical process for a study of this type, taking into account both the requirements of the Environmental Assessment Act and the necessary technical work for a project of this scope and complexity.

The study process provided for periods of public and external review at key stages and was flexible to accommodate unforeseen circumstances, yet remained focused on the goals of defining an appropriate solution to the identified problem and seeking approval for that solution.

Exhibit 2.1 outlines the study process followed (details of the Consultation Process are outlined in Section 2.2). The process was divided into five stages:

1. Problem Identification/Alternatives to the Undertaking
2. Generate Route Alternatives
3. Evaluate Route Alternatives and Select a Preferred Route
4. Prepare Concept Design
5. Environmental Assessment Report

#### **Stage 1 - Problem Identification/Alternatives to the Undertaking**

This stage involved the formulation of the Problem/Opportunity Statement. A detailed description of the Problem/Opportunity Statement is outlined in Chapter 3. Details of the Problem/Opportunity Statement were discussed at meetings with various External and Municipal Team representatives prior to the first and second set of Public Consultation Sessions. The Problem/Opportunity Statement was discussed with the public at the first set of Public Consultation Sessions. The refined Problem/Opportunity Statement was presented at the second set of Public Consultation Sessions.

The problem addressed in this study is a deficiency in the capacity of the transportation network in northern York and Durham Regions to accommodate forecasted commuter and recreational travel needs. Forecasted commuter trips indicate that transportation improvements are necessary to improve capacity of the network. Improvements to the transportation network are also required to meet weekend travel demands to areas north and east of Lake Simcoe.

The study also identified a plan which addresses this problem and allows for the protection of the Ministry of Transportation's long-term strategic goals for the movement of people and goods through northern York and Durham Regions, given the diminishing opportunity to protect for the long-term transportation needs in a cost-effective, non disruptive manner.

This stage also involved the generation, and assessment of alternative solutions to the problem. Alternative solutions considered included: do nothing, manage transportation demand, non-roadway solutions and roadway solutions. At the conclusion, developing a new road was identified as the only reasonable alternative. This assessment is discussed in greater detail in Section 3.3.



Stage 1

Stage 2

Stage 3

Stage 4

Stage 5

- PROBLEM IDENTIFICATION/ALTERNATIVES TO THE UNDERTAKING**
- Review Background Information
  - Transportation Need Analysis
  - Formulate Statement of Problem/Opportunity
  - Analysis of Alternatives to the Undertaking

- GENERATE ROUTE ALTERNATIVES**
- Identify Significant Study Area Features
  - Identify Corridor Opportunities
  - Refine Corridor Opportunities and Generate Route Alternatives

- EVALUATE ROUTE ALTERNATIVES/SELECT A PREFERRED ROUTE**
- Identification of Potential Impacts Associated with each Alternative
  - Identification of Mitigation Measure
  - Determine Net Effects of each alternative
  - Evaluate Alternatives using Net Impact Assessment Approach and Weighting/Scoring Method
  - Identification of Technically Preferred Route

- PREPARE CONCEPT DESIGN**
- Refine Technically Preferred Route
  - Identification of Potential Impacts Associated with the Recommended Route
  - Identification of Mitigation Measures
  - Recommendations for Monitoring and Commitments to Further Work
  - Prepare Concept Design

- ENVIRONMENTAL ASSESSMENT REPORT**
- Prepare Draft One-Stage Environmental Assessment Report
  - Circulate Draft Environmental Assessment Report to External Team.
  - Finalize Environmental Assessment Report and Submit to the Ministry of the Environment and Energy

ACTIVITIES

PRODUCTS

- Confirmation of Need for Transportation Service
- Draft Environmental Assessment Proposal
- Final Environmental Assessment Proposal

- Corridors
- Corridor Refinements
- Routes
- Route Refinements
- Initial Environmental Technical Papers

- Selection of the Technically Preferred Route
- Final Environmental Technical Reports

- Preparation of Concept Design
- Draft One-Stage Environmental Assessment Report
- Final One-Stage Environmental Assessment Report

STAKEHOLDER INVOLVEMENT

- Contacted:**
- External Team
  - Municipal Team
  - Interest Groups
  - General Public
- Met with:**
- Municipal Team
  - Municipal Councils
  - External Team
  - MNR
  - LSRC
  - OMAFRA
  - Interest Groups
  - General Public (PCS #1 & PCS #2)

- Contacted:**
- External Team
  - Municipal Team
  - Interest Groups
  - General Public
- Met with:**
- Municipal Team
  - Municipal Councils
  - External Team
  - MNR
  - LSRC
  - OMAFRA
  - MMA/OGTA/MOEE
  - Interest Groups
  - General Public (PCS #2, Workshop #1, PCS #3 & Workshop #2)

- Contacted:**
- External Team
  - Municipal Team
  - Interest Groups
  - General Public
- Met with:**
- Municipal Team
  - Municipal Councils
  - External Team
  - MNR
  - LSRC
  - OMAFRA
  - Interest Groups
  - General Public (PCS #4 & Workshop #3)

- Contacted:**
- External Team
  - Municipal Team
  - Interest Groups
  - General Public
- Met with:**
- Municipal Team
  - Municipal Councils
  - External Team
  - MNR
  - LSRC
  - OMAFRA
  - Interest Groups
  - General Public (PCS #4 & #5)

- Contacted:**
- External Team
  - Municipal Team
  - Interest Groups
  - General Public

STAKEHOLDER INVOLVEMENT

The assessment of alternative solutions to the problem was discussed with various External and Municipal Team representatives and meetings prior to the first set of Public Consultation Sessions and presented for comment to the public at the first and second set of Public Consultation Sessions.

### **Stage 2 - Generate Route Alternatives**

A four stage process was employed to generate route alternatives: 1) Identify Significant Study Area Features, 2) Identify Corridor Opportunities, 3) Refine Corridor Opportunities, and 4) Generate Route Alternatives. The generation of route alternatives was the major focus of the second and third set of Public Consultation Sessions and first and second set of Workshops. Details of the process and accompanying consultation is discussed in Chapter 4.

To assist in this process, Environmental Technical Reports were prepared. These reports documented existing and future conditions for all components of the environment (Natural, Socio-Economic, Cultural and Transportation). The Environmental Technical Reports were made available for public review at the Public Consultation Session and through a distribution to local libraries.

### **Stage 3 - Evaluate Route Alternatives**

The impacts associated with the route alternatives generated in the previous stage were analyzed. Both a "Weighting/Scoring" and "Trade-off" (Professional Judgment) Method were used to identify a Preferred Route. The evaluation of route alternatives is fully documented in Section 4.3. The results of the evaluation was presented to various External and Municipal Team representatives prior to the fourth set of Public Consultation Sessions.

### **Stage 4 - Prepare Concept Design**

Comments received during and after the fourth set of Public Consultation Sessions were used to refine the Preferred Route. Minor adjustments to the proposed alignment were made and site specific mitigation measures were identified. The Concept Design was presented at the fifth set of Public Consultation Sessions.

### **Stage 5 - Environmental Assessment Report**

The final stage involved documenting the planning process that led to the undertaking proposed for acceptance and approval by the Minister of Environment and Energy. Clarity and simplicity, as well as completeness and precision, were the primary objectives.

Prior to submitting the Environmental Assessment (EA) Report to the Minister of Environment and Energy, the Project Team circulated draft copies to the External Team in order to identify and resolve, to the extent possible, any outstanding issues.

Once the EA Report is formally filed, the Ministry of Environment and Energy arranges for a review to be prepared. Ministries, agencies and the public assess the technical quality and level of detail documented in the EA as well as alternatives considered. At the completion of the government review, a report is prepared and made available for comment on the EA. Municipalities and the public are then notified and given a minimum 30-day period to review and provide further comment.

## 2.2 CONSULTATION PROCESS FOR TRANSPORTATION AND ROUTE PLANNING

### 2.2.1 Introduction

Five features which are key to successful planning and approval under the Environmental Assessment Act include:

- consultation with affected parties;
- consideration of reasonable alternatives;
- consideration of all aspects of the environment (i.e., natural, social, economic, cultural and technical);
- systematic evaluation of net environmental effects; and
- clear and complete documentation of the planning process.

*(Source: Interim Guidelines on Environmental Assessment Planning and Approval, Ministry of the Environment, 1989).*

The Consultation Process developed for this study addressed each of these key features.

By definition, consultation “is a systematic, interactive process in which the proponent and other interested and affected parties exchange information, raise and respond to issues, discuss alternative solutions, and attempt to resolve areas of disagreement or controversy. It is a method of establishing communication to develop a better understanding among all parties before an Environmental Assessment is submitted to the Ministry of the Environment”.

*(Source: Towards Improving the Environmental Assessment Act, Ministry of the Environment, 1990).*

One of the intentions of this study was to ensure that, from the earliest stages of planning, decisions were made after considering environmental impacts. Consultation with affected parties was an essential component of the study process and provided a mechanism for MTO (as the proponent) to define and respond to issues before limiting decisions were made and the EA document was submitted.

As mentioned, the first key feature to successful planning and approval under the Act involves consultation with affected parties. Hence, the study was organized so that affected parties were:

- involved throughout the study;
- provided access to information;
- “provided sufficient time to respond to questions and data requests;
- encouraged to participate in an issue identification/resolution process.

The public has a major role and responsibility in determining the success of a public consultation program. The extent to which they participate, the issues they raise and how such issues are resolved all influence the effectiveness of the consultation process.

### 2.2.2 Study Organization

A multi-team approach was used to achieve the five features which are key to successful planning and approval under the Environmental Assessment Act. Teams and their respective roles are defined in the following sections.



The overall study schedule and team involvement is shown on Exhibit 2.2.

### **Project Team**

Representatives from MTO - Central Region Office, together with Cole, Sherman & Associates Ltd., formed the Project Team.

In addition to the day-to-day project management and study co-ordination, the Project Team ensured that all matters related to the Environmental Assessment Act were addressed.

An environmental/ecological and agricultural consultant was retained to assist in the collection of natural environment and agricultural data and the assessment of impacts.

### **Internal Team**

The Internal Team was made up of representatives from the various MTO district, regional and head offices. Their responsibilities included the provision of baseline data and technical comment on various route design alternatives.

### **External Team**

The External Team was made up of provincial government ministries as well as other agencies, such as utility and rail companies (Exhibit 2.3). Included on this team were those ministries/agencies which would eventually carry out the formal review of the Environmental Assessment Report.

At the start of the study, External Team members were contacted by mail and asked to respond to the following questions:

- Does your Ministry or agency have an interest in the study?
- Who will act as your Ministry/Agency spokesperson and our contact?
- Does your Ministry/Agency have any relevant background information?
- Does your Ministry/Agency have any comments or concerns?

Ministries/Agencies that participated on the External Team were responsible for ensuring that their respective mandates were identified to MTO at appropriate stages (see Exhibit 2.2). Minutes of meetings with external ministries and agencies are included in Appendix 7.

### **Municipal Team**

The Municipal Team was comprised of elected officials, planning and engineering staff from the following municipalities:

- Regional Municipality of York
- Town of Newmarket
- Town of East Gwillimbury
- Town of Georgina
- Regional Municipality of Durham
- Township of Uxbridge
- Township of Brock

| STAGE  | 1993   |        |      | 1994   |        |        | 1995 |        |        | 1996   |      |        | 1997   |        |      |
|--|--------|--------|------|--------|--------|--------|------|--------|--------|--------|------|--------|--------|--------|------|
|  | Spring | Summer | Fall | Winter | Spring | Summer | Fall | Winter | Spring | Summer | Fall | Winter | Spring | Summer | Fall |
| 1 Problem Identification/<br>Alternatives to the Undertaking |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |
| 2 Generate Route Alternatives                                |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |
| 3 Evaluate Route Alternatives                                |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |
| 4 Prepare Concept Design                                     |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |
| 5 Environmental Assessment Report                            |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |
| External Team Meeting  |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |
| York Region  |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |
| Durham Region  |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |
| Town of Newmarket  |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |
| Town of East Gwillimbury                                     |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |
| Town of Georgina   |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |
| Township of Uxbridge   |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |
| Township of Brock  |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |
| Ministry of Natural Resources                                |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |
| Lake Simcoe Region Conservation<br>Authority                 |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |
| Ministry of Agriculture, Food &<br>Rural Affairs             |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |
| Ministry of Environment & Energy                             |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |
| Ministry of Municipal Affairs and<br>Office of the GTA       |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |
| Stakeholders Meetings  |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |
| Public Consultation Sessions                                 |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |
| Workshops  |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |
| Pre-Submission Review  |        |        |      |        |        |        |      |        |        |        |      |        |        |        |      |

- ▲ South Lake Simcoe Naturalist Club - September 6, 1994  
 ▼ Pefferlaw Ratepayers Association - September 20, 1994  
 ▸ Information Meeting Arranged by P.A.T.H. - October 4, 1994  
 \* Site Visit with P.A.T.H.-October 25, 1994  
 ■ Information Meeting for Brock Residents - November 22, 1994  
 ◆ Information Meeting Arranged by Safe Truckers Ontario Police - November 8, 1994  
 □ Site visit with Pefferlaw Area Residents-April 6, 1995  
 i Site visit with Pefferlaw Area Residents-April 3, 1995  
 Presentation to STOP (Safe Truckers Ontario Police)-June 26, 1997
- ▲ First set of Public Consultation Sessions were held on June 22, 23, 28 and 29, 1993  
 ▼ Second set of Public Consultation Sessions were held on June 14, 21, 22, 23 and 24, 1994  
 ▸ First set of Workshops were held September 12, 19, 21, 22 and November 21, 1994  
 \* Third set of Public Consultation Sessions were held on March 27, 28, 29, April 3 and 6, 1995  
 ■ Second set of Workshops were held June 22, 26, 27, 29 and July 5 1995  
 ◆ Fourth set of Public Consultation Sessions were held on November 12, 18, and 19, 1996  
 □ Fifth set of Public Consultation Sessions were held on June 3, and 5, 1997

- |  |   |
|--|---|
| 1. Durham Region Board of Education  | 16. Ministry of Environment and Energy<br>Environmental Assessment Branch                     |
| 2. York Region Board of Education  | 17. Ministry of Environment and Energy<br>Approvals Branch                                    |
| 3. Durham Region Separate School Board   | 18. Ministry of Environment and Energy<br>Central Region                                      |
| 4. York Region Roman Catholic School Board   | 19. Ministry of Health<br>Public Health Branch  |
| 5. Greater Toronto Coordinating Committee  | 20. Ministry of Economic Development & Trade  |
| 6. Lake Simcoe Region Conservation<br>Authority                                      | 21. Ministry of Municipal Affairs & Housing<br>Plans Administration Branch                    |
| 7. Environment Canada<br>Environmental Assessment<br>Coordinating Committee          | 22. Ministry of Natural Resources<br>Maple District   |
| 8. Canadian Coast Guard<br>Navigable Waters Protection                               | 23. Ministry of Northern Development & Mines  |
| 9. Department of Indian & Northern Affairs<br>Environmental Planning & Management    | 24. Ministry of the Solicitor General<br>& Correctional Services                              |
| 10. Management Board Secretariat<br>Real Estate Branch - Central                     | 25. Ministry of the Solicitor General<br>& Correctional Services<br>Ontario Provincial Police |
| 11. Ministry of Agriculture, Food and<br>Rural Affairs<br>Land Use Planning Branch   | 26. Ontario Native Affairs Secretariat  |
| 12. Ministry of Community and Social<br>Services<br>Operational Co-ordination Branch | 27. CN Rail   |
| 13. Ministry of Citizenship, Culture<br>& Recreation<br>Heritage Policy Branch       | 28. GO Transit  |
| 14. Ministry of Citizenship, Culture<br>& Recreation<br>Tourism Industry Consultant  | 29. Ontario Hydro   |
| 15. Ministry of Education and Training<br>School Business & Finance Branch           | 30. Brock Township Fire Department  |
|  | 31. East Gwillimbury Fire Department  |
|  | 32. Georgina Fire Department  |
|  | 33. Newmarket Fire Department   |
|  | 34. Uxbridge Township Fire Department   |

## EXTERNAL TEAM

# HIGHWAY 404 EXTENSION

## Davis Drive to Highway 12

Route Planning Study and Environmental Assessment



As illustrated in Exhibit 2.2, meetings with staff and formal presentations to Council, or Committees of Council, were held prior to Public Consultation Sessions and at other times as necessary. Minutes of these meetings are included in Appendix 7.

### **Interest Groups**

Interest Groups, such as cottage/ratepayer associations, naturalist groups, snowmobile clubs, local Chambers of Commerce, etc. were invited at the onset to participate in the study process. Formal opportunities to comment on key decision points were also made available through the series of Public Consultation Sessions.

Interest Groups that participated in the study are listed in Exhibit 2.4.

### **The General Public**

Exhibit 2.5 outlines the public consultation program for this study. One of the key components of this program was the Public Consultation Sessions (PCS) which provided one of the most useful and beneficial techniques of exchanging information with the public. Public Consultation Sessions provided:

- a forum for reviewing project decisions to date and for providing comments to the Project Team as an input to further development of the proposal;
- a means of gathering additional study area information;
- an opportunity to address individual needs for information;
- follow-up on matters of specific interest to the individual; and,
- an opportunity to learn about potential effects on individual properties.

Five sets of Public Consultation Sessions were held in the study area, in locations accessible to all residents in the study area and were staged to provide input at the following key decision points:

- Project Initiation (Draft EAP)
- Corridor Generation
- Route Generation
- Route Evaluation/Recommended Route
- Concept Design

One limitation of Public Consultation Sessions is the inability to provide a forum for conflict resolution. To address this limitation, follow-up activities such as workshops, working meetings, focus group meetings and/or field trips were undertaken at four key decision points:

- Corridor Refinement
- Route Refinement
- Preferred Route
- Concept Design

A mailing list of interested individuals was established at the commencement of the study and continuously updated throughout the study. The purpose of this list was to ensure that individuals who stated an interest in the study were kept informed of upcoming events and the project's progress.

Throughout the course of the study the project team fielded numerous requests for information regarding the study's progress and process. These requests were followed-up by a letter, telephone conversation, meetings, or mailing of information.

### Natural Environment Groups

1. Black River Protection Association
2. Canadian Wildlife Federation
3. Citizens For Oak Ridges Moraine
4. Conservation Council of Ontario
5. Federation of Ontario Naturalists
6. Lake Simcoe Parklands Ltd.
7. South Lake Simcoe Naturalist Club
8. Uxbridge Conservation Association
9. Georgina Against Garbage
10. Save The Oak Ridges Moraine
11. S.C.O.P.E
12. Green Umbrella
13. Baldwin Wildlands Coalition
14. Baldwin Conservation Association
15. South Lake Simcoe Wilderness Coalition
16. Lake Simcoe Environmental Alliance

### Heritage Groups

1. Georgina Historical Society & Museum
2. Heritage Georgina
3. East Gwillimbury LACAC
4. East Gwillimbury Historical Society
5. Newmarket LACAC
6. Heritage Uxbridge
7. Newmarket Historical Society
8. Scotch Settlement & District Historical Society
10. Sharon Temple Museum
11. York Associations of Museums & Galleries
12. Heritage Whitchurch-Stouffville
13. Uxbridge-Scott Historical Society & Museum
14. Beaverton-Thorah-Eldon Historical Society - Beaverton River Museum
15. Sunderland District Historical Society

### Economic Groups

- |  |   |
|--|---|
| 1. Main Street Merchants Association (Newmarket) | 5. Newmarket Chamber of Commerce        |
| 2. Beaverton Chamber of Commerce                 | 6. East Gwillimbury Chamber of Commerce |
| 3. Georgina Board of Trade                       | 7. Sunderland Business Association      |
| 4. Uxbridge Chamber of Commerce                  |   |

### INTEREST GROUPS

## Ratepayer Groups

- |  |   |
|--|---|
| 1. Beaverton-Thorah Homeowner's Association                | 24. Lakeview Ratepayers Association           |
| 2. Briars Community Association Incorporated               | 25. Land's End Area Association               |
| 3. Briars Community Association                            | 26. McRae Beach Association                   |
| 4. Bristol Ponds Ratepayers Association                    | 27. Miami Beach Association                   |
| 5. Coalition of Beach & Ratepayers Association of Georgina | 28. Moore's Beach Cottage Owners Association  |
| 6. Corner's Park Cottagers Association                     | 29. Oak Ridges Moraine Ratepayers Association |
| 7. Crestwood Beach Cottagers Association                   | 30. Orchard Beach Gardens Association         |
| 8. Del-Franklin Beach Association                          | 31. Orchard Beach Ratepayers Association      |
| 9. Duclos Point Property Owners Association                | 32. Pepperlaw Association of Ratepayers       |
| 10. East Ave./West Ave. Area Cobra Association             | 33. Pine Beach Landowner's Association        |
| 11. East Gwillimbury Heights Ratepayers                    | 34. Pines Area Ratepayers Association         |
| 12. Eastbourne Community Association                       | 35. Quaker Village Residents Association      |
| 13. Ellsrock Cobra Association                             | 36. Ravenshoe Channels Residents Association  |
| 14. Elmhurst Beach Association                             | 37. Riverview Beach Cottagers Association     |
| 15. Estonian Summer Homes Association                      | 38. Roches Point Property Owners Association  |
| 16. Glenwood Beach Association                             | 39. Rose of Sharon                            |
| 17. Goodwood Ratepayers Association                        | 40. Royal Beach Association                   |
| 18. Indianola Beach Association                            | 41. South Brock Ratepayers Association        |
| 19. Islandview Beach Association                           | 42. Sutton By-The-Lake Association            |
| 20. Keswick Beach Association                              | 43. Testa Heights Ratepayers Association      |
| 21. Keswick By-The-Lake Ratepayers Association             | 44. Wagner Lake Ratepayers Association        |
| 22. Kivioja Ratepayers Association                         | 46. West Point Cottage Association            |
| 23. Lake Drive East Cobra Association                      | 47. PATH 404                                  |

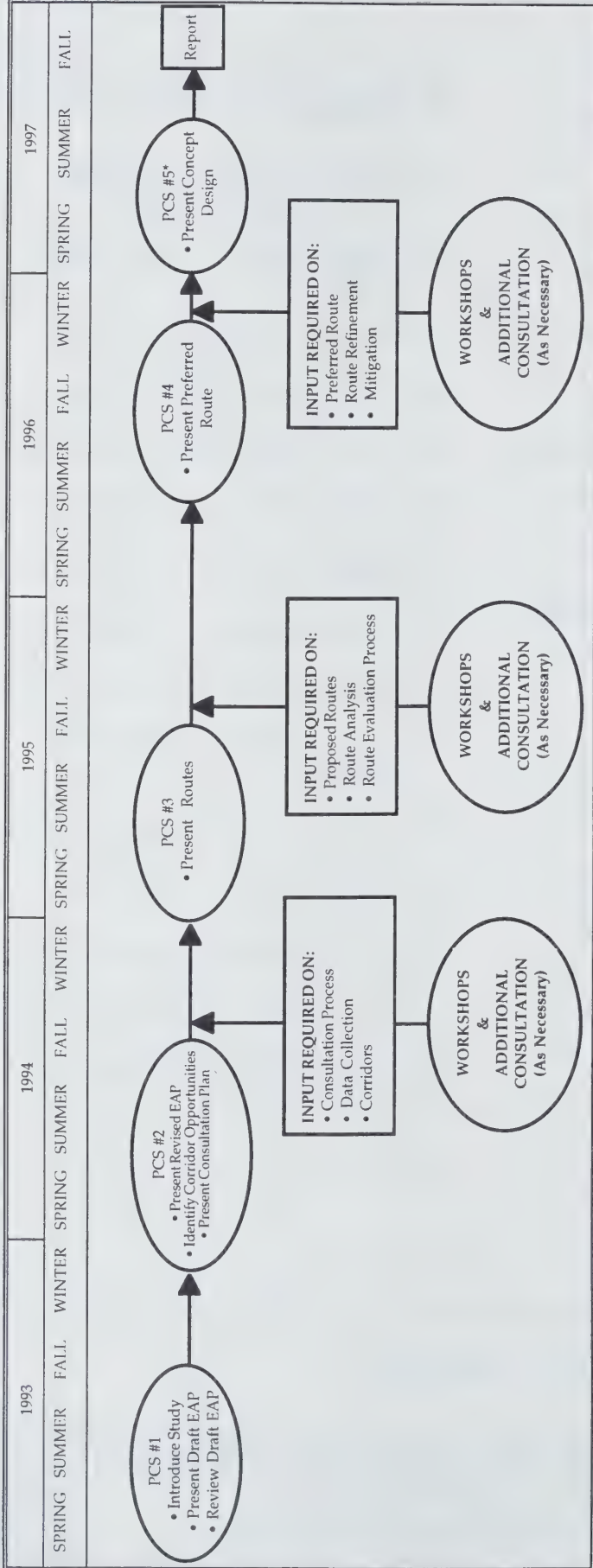
## INTEREST GROUPS



## Agricultural Groups

- |   |   |
|---|---|
| 1. Ontario Federation of Agriculture                  | 20. Durham Region Beef Farm Management Association  |
| 2. York Cattlemen's Association                       | 21. Durham Region Sheep Farm Management Association |
| 3. York Corn Producers                                | 22. Durham Region Cream Producers' Association      |
| 4. York Federation of Agriculture                     | 23. Durham County Holstein Club                     |
| 5. York Holstein Club                                 | 24. Ontario County Holstein Club                    |
| 6. York Milk Committee                                | 25. Durham County Milk Committee                    |
| 7. York Pork Producers                                | 26. Ontario County Milk Committee                   |
| 8. York Soil & Crop Improvement Association           | 27. Durham West Pork Producers' Association         |
| 10. York Wheat Producer's Association                 | 28. Durham Region Sheep Producers                   |
| 11. York 4-H Association                              | 29. Ontario County Farm Safety Association          |
| 12. Durham West Soil and Crop Improvement Association | 30. Durham Region Federation of Agriculture         |
| 13. Durham Region Corn Producers                      | 31. Durham Region Plowmen's Association             |
| 14. Durham Region Wheat Producers                     | 32. Durham West Junior Farmers' Association         |
| 15. Northumberland-Durham Apple Growers' Association  | 33. Durham West 4-H Leaders' Association            |
| 16. Durham County Eastern Breeders' Inc.              | 34. Local Agricultural Employment Board             |
| 17. Durham West Cattlemen's Association               | 35. Durham Agri-food Awareness Team                 |
| 18. Durham East Cow Calf Club                         |   |
| 19. Ontario County Beef Herd Improvement Club         |   |

## INTEREST GROUPS



PCS - Public Consultation Session

\* PCS #5 included both a Public Consultation Session Component and a Workshop Component

In addition to providing comments, verifying information and outlining project specific concerns, the general public was involved in the evaluation of route alternatives by participating in a weighting exercise on the evaluation criteria. A detailed discussion of this exercise is documented in Section 4.4 and Appendix 6.

### **2.2.3 Environmental Assessment Proposal**

At the initiation of this project, an Environmental Assessment Proposal (EAP) was prepared which incorporated the procedures and principles of the Ministry of Environment and Energy's May 1992 publication "EAP Guidelines". The primary purpose of the Highway 404 Extension EAP was to provide a focus for early and meaningful consultation on the proposed planning process. In addition to the planning process, the EAP specifically addressed:

- The problem/opportunity;
- The proposed study area;
- The transportation alternatives being considered (Alternatives to the Undertaking);
- The proposed evaluation process; and
- The proposed consultation plan.

### **Stakeholder Review of the Draft EAP**

The draft EAP was made available for public and agency review in June 1993. Four distinct groups of stakeholders were identified as participants in the review process: interested individuals, interest groups, external team and municipal team. The following summarizes the measures taken to involve these participants:

#### **Interested Individuals**

Copies of the draft EAP were available for review by interested individuals at the first series of Public Consultation Sessions (June 1993). Newspaper advertisements were placed in local, regional and provincial newspapers to inform interested individuals and advise them of the availability of the EAP. Approximately 110 copies of the draft EAP were distributed to interested individuals.

#### **Interest Groups**

In addition to the copies distributed at the first series of Public Consultation Sessions, draft EAPs were also sent to approximately 120 interest groups listed on the Project Team mailing list. This mailing list was provided by the municipalities in the study area and was augmented through discussions with area residents at the Public Consultation Sessions.

#### **External Team**

A copy of the draft EAP was sent to each contact on the External Team mailing list with a request to review and comment on the document.

#### **Municipal Team**

Copies of the draft EAP were distributed to all municipalities in the study area for review and comment. The draft EAPs were provided to the municipalities either at meetings or through correspondence.



## **The Final EAP**

The comments received from the stakeholder review resulted in specific changes being made to the draft EAP. The Final EAP for the Highway 404 Extension was published in June, 1994, and is available for review, upon request, at MTO and libraries in the study area.

### **2.2.4 Consultation Events**

The following sections explain the purpose of each set of Public Consultation Sessions and each set of Workshops. For a detailed discussion of each set of Consultation Sessions and each set of Follow-up Activities, see Appendix 5.

Notification of the Consultation Sessions was provided in the following ways:

- advertisement in local, regional and provincial newspapers;
- brochures mailed to residents in the study area and on the mailing list;
- letters mailed directly to external, municipal, and interest group representatives; and
- Registered letters sent to individuals directly affected by the Technically Preferred Route for the fourth set of Public Consultation Sessions.

In addition, newspaper articles published in local papers also updated stakeholders.

In addition to these formal consultation events, the project team was invited to appear on local cable television twice during the study. The purpose of these appearances was to provide another forum for the public to keep informed about the study progress.

### **First Series of Public Consultation Sessions**

The first set of Public Consultation Sessions was held in June, 1993. Four Consultation Sessions were held at four locations in the study area (Queensville, Newmarket, Zephyr and Sunderland).

The purpose of this set of Consultation Sessions was to:

1. Introduce the Study.
2. Present the draft Environmental Assessment Proposal which documented the following:
  - The problem/opportunity;
  - The proposed study area;
  - The transportation alternatives being considered (Alternatives to the Undertaking);
  - The proposed evaluation process; and
  - The proposed consultation plan.
3. Gather information and identify concerns and issues.
4. Receive written comments from those in attendance.

A total of 495 people choose to sign-in and 55 comment sheets were received from the four Consultation Sessions. A copy of the PCS Summary Report is included in Appendix 5.

## **Second Set of Public Consultation Sessions**

The second set of Public Consultation Sessions was held in June, 1994. Five Consultation Sessions were held five at locations in the study area including Queensville, Zephyr, Sunderland, Pefferlaw and Keswick.

The purpose of this set of Consultation Sessions was to:

1. Present the Final Environmental Assessment Proposal including the revised:
  - problem/opportunity statement;
  - proposed study area;
  - transportation alternatives being considered (Alternatives to the Undertaking);
  - proposed evaluation process; and
  - proposed consultation plan.
2. Present the data collected to date.
3. Present the process for route generation.
4. Present the opportunity corridors identified.
5. Review proposed evaluation criteria and methods.
6. Receive input on evaluation criteria weighting.
7. Identify individuals interested in participating in workshops.
8. Gather information and identify concerns and issues.
9. Receive written comments from those in attendance.

A total 644 people chose to sign-in and 91 comment sheets were received over the five Consultation Sessions. Comments and issues raised during these Consultation Sessions are documented in Section 4.2.3 Consultation - Identify Corridor Opportunities (a copy of the PCS Summary Report is included in Appendix 5).

## **First Set of Workshops**

The first set of workshops was held in September, 1994. The primary purpose of these workshops was to obtain additional information on the Study Area to assist in the corridor refinement and route generation process. A secondary purpose of these workshops was to further inform area residents about the study and study process.

The following measures were used to inform people about these workshops:

- Ontario Government Notices were placed in local, regional and provincial newspapers requesting interested individuals to attend the second set of Public Consultation Sessions in order to sign-up for the workshops, or contact the Project Team directly to sign-up for the workshops;
- Approximately 25,000 brochures were distributed through general delivery to all study area residents encouraging interested individuals to attend the second set of Public Consultation Sessions and informing them of the workshops. One could sign-up for the workshops at the PCS, or contact the Project Team directly; and
- The workshop concept was explained on display boards, and at a staffed sign-up table at the second set of Public Consultation Sessions. Project Team members encouraged attendees to sign-up for these workshops.

At the Public Consultation Sessions, a total of 154 people signed-up for the workshops, and an additional three people contacted the Project Team directly to request an invitation to these workshops.

To accommodate the large number of people that signed up for the workshops, four workshops were arranged at Zephyr, Keswick, Sharon and Pepperlaw in the Study Area. Interested parties were sent an invitation letter and an agenda for the scheduled workshop closest to their listed residence. A note was added to each letter informing people that if they could not attend the workshop they should contact the Project Team to inquire about other workshop dates and locations.

The first half of the workshops focused on reviewing the existing data collected for the Natural Environment and Agricultural Operations. Participants were divided into two groups and obtaining additional information from local residents. Each group spent approximately 45 minutes with a Project Team specialist reviewing existing data and adding new information where possible.

The second half of the workshop focused on scoping social environment issues.

Participants at these workshops were also asked to sign-up for a heritage and archaeological workshop. This workshop was held on November 21, 1994 at the Egypt Hall and was attended by 21 people.

A copy of the Workshop Summary Report is included in Appendix 5.

### **Third Set of Public Consultation Sessions**

The third set of Public Consultation Sessions was held in March and April of 1995. Five Consultation Sessions were held in the study area including Queensville, Egypt, Udora, Pepperlaw and Beaverton.

The purpose of this set of Consultation Sessions was to:

1. Present the preliminary route alternatives.
2. Obtain comments on possible route refinements.
3. Present the proposed method for selecting a preferred route.
4. Provide an opportunity for interested individuals to sign-up for upcoming workshops.
5. Receive written comments from those in attendance.

In all, 1,269 people choose to sign-in over the five PCSs and 182 comment sheets were received. Comments and issues raised during these Consultation Sessions are documented in Section 4.3.3 Consultation - Generate Route Alternatives. A copy of the PCS Summary Report is included in Appendix 5.

### **Second Set of Workshops**

The second set of workshops was held in June/July 1995. The primary purpose of these workshops was to review the route alternatives presented at the previous PCS to determine if any refinements should be made prior to evaluation which would reduce the overall impacts associated with the route alternative. The proposed evaluation criteria was also reviewed to determine if any measures should be changed or added prior to evaluation. A secondary



purpose of these workshops was to further inform area residents about the study and study process and obtain additional study area data.

The following measures were taken to inform people about these workshops:

- Ontario Government Notices were placed in local, regional and provincial newspapers notifying interested individuals to attend the third set of Public Consultation Sessions in order to sign-up for the workshops, or contact the Project Team directly to sign-up for the workshops;
- Approximately 25,000 brochures were distributed to all study area residents requesting interested individuals to attend the third set of Public Consultation Sessions in order to sign-up for the workshops, or contact the Project Team directly to sign-up for the workshops; and
- The workshop concept was explained on display boards, and at a staffed sign-up table at the third set of Public Consultation Sessions. Project Team members encouraged attendees to sign-up for these workshops

A total of 393 people signed up to attend the second set of workshops.

To accommodate the large number of people that signed up for the workshops, five workshops were arranged in the study area (Queensville, Pepperlaw, Egypt, Udora and Beaverton). Interested parties were sent an invitation letter and an agenda for the workshop closest to their residence. A note was added to each letter informing people that if they could not attend the workshop they should contact the Project Team to inquire about other workshop dates and locations.

Participants were divided into two groups. Each group spent approximately one hour with Project Team members discussing possible route refinements and reviewing evaluation criteria.

A copy of the Workshop Summary Report is included in Appendix 5.

#### **Fourth Set of Public Consultation Sessions**

The fourth set of Public Consultation Sessions were held in November 1996. Three Consultation Sessions were held in the study area including Sharon, Egypt, and Pepperlaw.

The purpose of this set of consultation sessions was to:

1. Present and obtain input on the evaluation of route alternatives.
2. Present and obtain input on the Preferred Route.
3. Receive written comments from those in attendance.

In all, 600 people choose to sign-in over the three PCSs and 87 comment sheets were received. A copy of the PCS Summary Report is included in Appendix 5.

#### **Fifth Set of Public Consultation Sessions**

The fifth set of Public Consultation Sessions were held in June 1997. Two Consultation Sessions were held in the study area at Egypt and Pepperlaw.

This set of Consultation Sessions was organized as a combined drop-in centre and working meeting.

The drop-in centre component of the Session allowed members of the public the opportunity to review engineering drawings of the technically preferred route and discuss the project with project team representatives.

The working meeting component provided members of the public the opportunity to meet individually with the highway designers and review potential impacts to property and discuss possible minor modifications.

The purpose of this set of consultation sessions was to:

1. Present and obtain input on the Concept Design
2. Review property impacts and discuss possible minor modifications.
3. Receive written comments from those in attendance.

In all, 235 people chose to sign-in over the two PCSs and 40 comment sheets were received. A copy of the PCS Summary Report is included in Appendix 5.

### 2.2.5 Pre-Submission Review

The consultation process involved the preparation of a Draft Environmental Assessment Report that was provided to Federal and Provincial Review Agencies for comments. Correspondence with review agencies and comments received from this review are included in Appendix 9.

The comments received from the review agencies and the associated action/response are listed on the following table:

| Comments  | Action/Response  |
|---|--|
| <b>MOE Environmental Planning and Analysis Branch</b>   |  |
| <i>General Comments</i>   |  |
| <ul style="list-style-type: none"> <li>This report should identify impacts and mitigation pertaining to stormwater management and stormwater management facilities</li> <li>The report should reference the application of MOE's 1994 Storm Water Management Guideline</li> <li>The report does not include reasonably rigorous technical documentation upon which to base decisions on preferred route selection and/or route segment selection and assembly.</li> <li>At certain locations along the preferred route, swampy or peat areas will be encountered, requiring dredging or pile driving; either operation could have impacts to shallow groundwater systems as well as surface water systems.</li> </ul> | <ul style="list-style-type: none"> <li>Section 5.2.7 revised</li> <li>Section 5.2.7 and Exhibit 5.10 revised</li> <li>The EA report contains all of the technical and analytical work needed to substantiate the recommendations for the preferred route. The technical studies referred to by MOE are those normally associated with the design phase of the project; these studies will be provided well in advance of any construction activities.</li> <li>Potential groundwater and surface water systems impacts and mitigation will be examined in greater detail during the design phase.</li> </ul> |

|  |   |
|--|---|
| <i>Ground Water</i>  |   |
| <ul style="list-style-type: none"> <li>Wells in the Sutton to Brock Townline section will require more detail to determine impacts and mitigation.</li> <li>Between Sutton and Ravenshoe, road cuts may breach the clay veneer, thus draining wells dry; replacement wells would likely be required.</li> <li>Note location of Georgina Landfill and Thane smelter site.</li> <li>Note locations of Queensville and Sharon municipal wells.</li> <li>Locations of private water wells within 100 m of the ROW should be noted on the plans</li> <li>The upper and lower tier municipalities should be consulted regarding the existence of draft approved and final approved (un-built) development plans within 100 m of the ROW that will be serviced by private individual wells.</li> </ul>  | <ul style="list-style-type: none"> <li>Potential groundwater and surface water systems impacts and mitigation will be examined in greater detail during the design phase.</li> <li>Potential groundwater and surface water systems impacts and mitigation will be examined in greater detail during the design phase.</li> <li>Landfill is shown in Exhibit 4.5; both landfill and smelter site are avoided by preferred route.</li> <li>Wells information has been noted in Transportation and Utilities Technical Report. This information will be updated as appropriate during the design phase.</li> <li>As discussed in Section 5.4.2.5, impacts to groundwater were assessed on a hydrogeological basis, since well records were not uniformly available for the study area. The location of individual private wells was not a significant factor in the route location process. Locations and depths of wells within close proximity to the new highway will be identified during the design phase.</li> <li>Section 5.4.2.5 was revised to reflect the information provided by municipalities.</li> </ul> |
| <i>Waste/Contaminated Sites</i>  |   |
| <ul style="list-style-type: none"> <li>Note the location of existing and closed landfill sites in the study area.</li> <li>If contaminated sites are encountered, the appropriate MOE District Office should be contacted.</li> </ul>  | <ul style="list-style-type: none"> <li>The sites are shown on Exhibit 4.5. The sites are all outside the proposed ROW.</li> <li>Added Section 5.4.4.3 and revised Exhibit 5.10.</li> </ul>  |
| <i>Ecosystems</i>  |   |
| <ul style="list-style-type: none"> <li>The MTO is encouraged to consider any relevant information related to ongoing or completed watershed/ sub-watershed plans and other ecosystem based studies.</li> </ul>   | <ul style="list-style-type: none"> <li>The Natural Environment Technical Report documents how such studies were incorporated in this EA Report</li> </ul>   |
| <i>Noise/Vibration</i>   |   |
| <ul style="list-style-type: none"> <li>The proponent should consult with the local and regional municipalities to identify draft approved/final approved un-built development plans for residential areas and noise sensitive locations; if there are approved plans in place, the MTO would be responsible for noise mitigation.</li> <li>Report should indicate noise sensitive locations other than homes and trailers.<br/>Discrepancy in values shown in Table 11 in Appendix 2 and Exhibit 5.9.</li> <li>Section 3.3.5 of Appendix 2 should reflect MTO/MOE Noise protocol, which requires MTO to mitigate noise levels as administratively, economically and technically feasible.</li> <li>Section 5.4.3.2 should indicate a commitment by the proponent to prepare a Noise Impact Assessment Report as per the MTO/MOE Noise Protocol.</li> <li>Section 5.4.3.2 should briefly describe noise level increases (if any) expected to occur along major roads in the area as a result of the proposed extension of Highway 404.</li> </ul> | <ul style="list-style-type: none"> <li>Any such developments were identified, as noted in Section 5.4.3.2 and Appendix 2. Responsibility for mitigation is noted accordingly.</li> <li>No other noise sensitive land uses were identified in the analysis and evaluation of alternatives.</li> <li>Exhibit 5.9 revised</li> <li>Section 3.3.5 of Appendix 2 revised</li> <li>Section 5.4.3.2 revised</li> <li>The Noise Impact Assessment Report to be conducted during the design phase will investigate noise impacts at interchange locations.</li> </ul>  |



| Comments  | Action/Response  |
|---|--|
| <b>Construction</b>   |  |
| <ul style="list-style-type: none"> <li>The Design and Construction Report should be referenced in Section 5.4.3.2 and address information relating to construction noise and vibration control measures.</li> </ul>   | <ul style="list-style-type: none"> <li>Section 5.4.3.2 revised</li> </ul>  |
| <b>Text-Specific</b>  |  |
| <ul style="list-style-type: none"> <li>Additional property outside the minimum ROW width should be identified.</li> <li>Minor refinements to alignment should be restricted to within the defined ROW.</li> <li>Fish habitat (Section 1.2.1.2) appears to be the only consideration for assessing watercourse impacts.</li> <li>The 2<sup>nd</sup> paragraph of Section 5.4.2.1 notes that "these potential impacts to the aquatic environment" can not readily assessed at this time. What are these impacts?</li> <li>Ditches and swales (Section 5.4.2.1) are important in that they provide useful functions of sediment collection and nutrient uptake.</li> <li>The discussion of impacts and habitat loss (Section 5.4.2.1) should include discussion of the expected impact on the local hydrologic regime.</li> <li>Section 5.4.2.5 should reference O. Reg. 903 for well decommissioning, and O. Reg. 358 for septic system decommissioning, and note participation of Regional Health Units.</li> <li>Well monitoring (Section 5.4.2.5) is required for both water quality and quantity.</li> <li>Mitigation measures should be noted for water supplies impacted by the undertaking.</li> <li>Areas where no residences are located also require protection of ground water supplies.</li> <li>The water bearing formation that supports wells in areas of low hydrogeological sensitivity could be impacted by construction operations.</li> <li>Section 5.4.4.1 should note mitigation of dust and salt spray impacts to tender fruits and vegetables grown in proximity to the new highway.</li> <li>With reference to Section 5.5, the formal EA should not be submitted without the technical studies to substantiate the recommendation for the preferred route.</li> </ul> | <ul style="list-style-type: none"> <li>Wording pertaining to additional property requirements revised.</li> <li>The text identifies that additional property may be required for route refinements and associated features which are mitigation related. The proposed ROW has been defined at a conceptual design level of detail; property limits will be better defined during the design phase.</li> <li>Watercourse impacts were also assessed from a groundwater perspective (refer to Section 5.4.2.5), a riparian vegetation perspective (refer to Section 5.4.2.2) and a wetlands perspective (refer to Section 5.4.2.3).</li> <li>The potential impacts are described in the remaining paragraphs of Section 5.4.2.1.</li> <li>Comment noted.</li> <li>Refer to Section 5.4.2.3 Wetlands.</li> <li>Section 5.4.2.5 revised.</li> <li>Section 5.4.2.5 revised.</li> <li>Section 5.4.2.5 notes mitigation to water supplies by location, as identified by existing residences, and by soil type/sensitivity.</li> <li>Exhibit 5.8 notes soil type/sensitivity as well as number of wells in proximity to the highway. Mitigation measures are identified in areas where no residences exist.</li> <li>Comment noted. Details of the soils and hydrogeology will be obtained during the design phase.</li> <li>Section 5.4.4.1 revised.</li> <li>The EA Report contains all of the technical and analytic work needed to substantiate the recommendation for the preferred route. The technical studies referred to in Section 5.5 are those associated with the design phase of the project. Their purpose is to assess the effects at the level of detail necessary to determine the next effective mitigation methods.</li> </ul> |

| Comments   | Action/Response   |
|--|---|
| <ul style="list-style-type: none"> <li>EA technical work associated with any staging of highway construction should be completed for the entire facility for the sake of efficiency and to avoid costly retrofits. Stormwater management facilities should be designed for the full four-lane highway.</li> </ul>  | <ul style="list-style-type: none"> <li>The level of effort of the design phase will reflect the work being proposed. Staging of the highway will be determined in the design phase, however, certain features of the highway, such as stormwater management planning would be carried out for the ultimate design (four-lane highway) for the reasons noted by MOE.</li> </ul>  |
| <b>Ministry of Citizenship, Culture and Recreation Cultural Programs Branch</b>  |   |
| <ul style="list-style-type: none"> <li>Satisfied that study took steps to consider impacts to cultural heritage features</li> <li>Satisfied that proposed assessment and mitigation process will satisfactorily address the conservation of cultural heritage features, where impacted</li> <li>Please forward Appendices for information</li> <li>MTO should ensure that archaeological sites are registered with MCzCR Provincial Archaeological Sites Database</li> </ul> | <ul style="list-style-type: none"> <li>Comment noted</li> <li>Comment noted</li> <li>Will forward Appendices with Final Report</li> <li>MTO to contact MCzCR and register sites</li> </ul>  |
| <b>Ministry of Agriculture, Food and Rural Affairs – Agricultural and Rural Division</b>   |   |
| <ul style="list-style-type: none"> <li>Noted that no service roads are planned to be established along transition section</li> <li>Noted that MTO is committed to reassess traffic prior to construction of the recommended plan along the transition section</li> </ul>   | <ul style="list-style-type: none"> <li>Comment noted</li> <li>Comment noted</li> </ul>  |
| <b>Canadian Environmental Assessment Agency</b>  |   |
| <ul style="list-style-type: none"> <li>None provided</li> </ul>  | <ul style="list-style-type: none"> <li>Not required</li> </ul>  |
| <b>Lake Simcoe Region Conservation Authority</b>   |   |
| <ul style="list-style-type: none"> <li>It is likely that portions of the new highway will be built within the Regulatory floodplain of the Maskinonge River</li> <li>Concerned about loss of wetland and forested areas within the Maskinonge River basin</li> </ul>   | <ul style="list-style-type: none"> <li>Potential impacts to the floodplain will be reviewed during the design phase; proposed mitigation measures will be reviewed with LSRCA prior to implementation (refer to Chapter 5)</li> <li>Impacts to wetland and forested area were considered during the route generation and evaluation stages of the project (refer to Chapters 4 and 5)</li> </ul>  |
| <b>Lake Simcoe Region Conservation Authority</b>   |   |
| <ul style="list-style-type: none"> <li>Proposed route impacts natural heritage areas</li> <li>Suggested realignments to reduce impacts to natural areas</li> </ul>   | <ul style="list-style-type: none"> <li>Impacts to natural heritage areas considered in generation, evaluation and selection of route alternatives (refer to Chapters 4 and 5)</li> <li>Areas of MNR concern and suggested realignments were discussed in previous meetings (refer to Appendix 7). Section 4.3 discusses route generation consultation and refinements considered. the evaluation of route refinements identified a preferred routing which, when compared to the other considerations, provided the best overall balance of advantages and disadvantages.</li> <li>MTO has committed to consultation with MNR throughout the design phase of this project.</li> </ul> |
| <b>Ministry of Citizenship, Culture and Recreation Area Manager</b>  |   |
| <ul style="list-style-type: none"> <li>Have reviewed the draft and have no comments</li> </ul>   | <ul style="list-style-type: none"> <li>Comment noted</li> </ul>   |

### **2.2.6 Future Design Consultation Process**

The MTO is committed to involving affected stakeholders in the design process to ensure that the Highway is designed and constructed in a way that is responsive to these stakeholders' interests.

Since the design has not commenced, there is ample opportunity for meaningful stakeholder input. The following sets out the proposed consultation process.

#### **The External Group**

The external group consists of the technical agencies having expressed an interest in ongoing involvement with the Highway 404 Extension project. They have been involved through the planning of this project and will continue to be kept informed and consulted during the design and construction phases, through correspondence and meetings as issues that are relevant to specific agency mandated concerns arise.

#### **Municipal Involvement**

Throughout the planning of this undertaking municipal staff and elected officials have been involved. During the design and construction phases, municipal staff will be consulted on an ongoing basis as issues arise.

#### **Public Consultation**

The public has been kept informed of the progress of this project and has influenced the planning of the undertaking. In order to keep the public informed through the design phase and allow for public input, public consultation sessions will be held during the design phase.

## **2.3 OVERVIEW OF CHANGES RESULTING FROM CONSULTATION**

The numerous opportunities for consultation resulted in a number of changes and refinements. These changes were primarily focused on improvements to the location of corridors and routes.

### **Study Area**

The study area presented at the first series of public consultation sessions was developed to address the problem of a road transportation inefficiency brought about by the absence of a direct and efficient route across northern York and Durham Regions. In addition to updated traffic forecasts which indicated changes to the proposed study area limits were necessary to address future travel needs, comments on the proposed study area were also received at the consultation sessions. The study area was revised to allow generation of alternative methods which would better address transportation problems in this area.

### **Corridor Opportunities**

The corridors were first presented at the second series of public consultation sessions and at the first set of workshops. As a result of comments received at these consultation events, and the gathering of additional study area information, a total of 13 corridor refinements were suggested. These refinements generally expanded the areas identified as being suitable for route generation. All of these refinements were implemented. The details of these refinements are presented in Section 4.2.



## **Route Alternatives**

Route alternatives were presented to the public at the third set of public consultation sessions and the second set of workshops. A few individuals noted concerns with the level of detail proposed to assess the natural environment impacts for route alternatives. The Project Team had a similar concern, primarily related to the lack of consistent level of detail provided by secondary sources on natural environment features throughout the study area. A more detailed field investigation program was developed to address this consistency concern and improve the level of detail of data collected. The details of this additional work is described in Section 4.3.3 and the Natural Environment Technical Report.

In total, 13 route refinements were suggested to reduce the impacts associated with the route alternatives. Following these consultation events the project team assessed the merits of each of these refinements. The refinements were assessed based on the design objectives used to generate alternatives. Eleven of the suggested refinements were implemented. The details of these refinements are presented in Section 4.3.

## **Route Analysis and Evaluation**

The evaluation criteria proposed by the Project Team was available for public review at the first, second and third public consultation sessions. Evaluation criteria were also presented at the second set of workshops. Comments received and changes made are presented on Exhibit 4.22 and in Appendix 5.

## **Refinements to the Technically Preferred Route**

The technically preferred route was presented to the public at the fourth series of Public Consultation Sessions. A total of three refinements were implemented as a result of comments received at these sessions. Details of these refinements are presented in Section 4.7.









### **3.0 TRANSPORTATION NEEDS ASSESSMENT**

#### **3.1 PROBLEM/OPPORTUNITY STATEMENT**

The initial problem statement developed for this project was based on the findings of the Highway 89 Overview Study completed by MTO in 1989. The Highway 89 study looked at connecting Highways 400, 404 and 7 to address the issues of out-of-way travel, inefficient movement and highway network continuity for east-west travel across northern York and Durham Regions.

In the summer of 1993, the Office of the Greater Toronto Area (OGTA) released population and employment projections to year 2021 for south-central Ontario, including northern York and Durham Regions. As well, York Region published its first Official Plan, reflecting the Region's development policies and aspirations to year 2021. When this information was used to forecast travel demand in northern York and Durham Regions, the transportation problems were significantly different and much more quantifiable than those originally presented.

Based on the comments received on the problem statement included in the draft Environmental Assessment Proposal (EAP) and the future travel demand information provided by OGTA and the York Region Official Plan, a statement of problem and opportunity for the Highway 404 Extension Route Planning Study and Environmental Assessment was redeveloped and presented in the Final EAP.

The problem addressed in this study is a deficiency in the capacity of the transportation network in northern York and Durham Regions to accommodate forecasted commuter and recreational travel needs. Forecasted commuter trips indicate that transportation improvements are necessary to improve capacity of the network. The problems with the road network in the central portion of York Region (i.e. in the vicinity of Newmarket/Sharon) are primarily commuter-based. In the more northerly portions of York and Durham Regions (i.e. along the south shore of Lake Simcoe) and around the east side of Lake Simcoe, recreational travel demands have increasing significance. Improvements to the transportation network are also required to meet weekend travel demands to areas north and east of Lake Simcoe.

The study also addresses the opportunity to identify a plan which addresses this problem and allows for the protection of the Ministry of Transportation's long-term strategic goals for the movement of people and goods through northern York and Durham Regions, given the diminishing opportunity to protect for the long-term transportation needs in a cost-effective, non-disruptive manner.

##### **3.1.1 Problem**

##### **Existing Conditions - Commuter Trips**

The transportation network in northern York and Durham Regions is predominantly roadway-based (Exhibit 3.1). Highway 404, which terminates at Davis Drive in Newmarket, is the only freeway serving the area. Highway 48, a two-lane highway, serves eastern York Region and northern Durham Region. Numerous regional roads provide local access to the many rural centres and small communities in the area. Weekday morning peak hour desired trips (trips along a straight line between origin and destination) from northern York and Durham Regions (and beyond) to south and central York Region and Metropolitan Toronto are shown in Exhibit 3.2 (1991 data).





### ORIGINS

- Simcoe
- Northern York
- Northern Durham
- Northern Ontario

LAKE SIMCOE

REGIONAL MUNICIPALITY  
OF DURHAM

REGIONAL MUNICIPALITY  
OF YORK

### DESTINATIONS

- South/Central York
- Metro

4,400

3,300

2,200

WEEKDAY MORNING PEAK HOUR TRIPS (1991)

During weekday morning peak periods, traffic from Newmarket, East Gwillimbury, Georgina and portions of northern Durham Region converge on the Davis Drive terminus to access Highway 404. As a result, Davis Drive and sections of Leslie Street and Woodbine Avenue north of Davis Drive experience traffic congestion during these times (Exhibit 3.3). This scenario is repeated during afternoon peak periods as commuters return to northern York and Durham Regions.

#### **Future Conditions - Commuter Trips**

By the year 2011, population and employment levels in York and Durham Regions are expected to double to approximately 1.9 million residents and 810,000 jobs. This increase in population and employment will result in an increase in commuter trips to central and southern York Region and Metropolitan Toronto.

Exhibit 3.4 shows the forecasted desired trips originating from northern York and Durham Regions (and beyond) during the weekday morning peak hour (i.e. commuter trips) destined for southern York and Durham Regions and Metropolitan Toronto by the year 2011.

To assess the impact of this growth on the area's transportation network, a transportation modeling exercise was undertaken. The modeling exercise assessed transportation conditions based on the future roadway and transit networks in south-central Ontario in year 2011 and determined the trip volumes (expressed as number of vehicles) between zones within south-central Ontario during morning peak periods. The model incorporated the future road network of this area, based on road improvements planned to be completed by York Region, Durham Region and MTO by the year 2011. The future road network is identified in the Transportation and Utilities Technical Report, which is available for review, upon request, at MTO and libraries in the study area. Details of the transportation modeling exercise are included in Appendix 1.

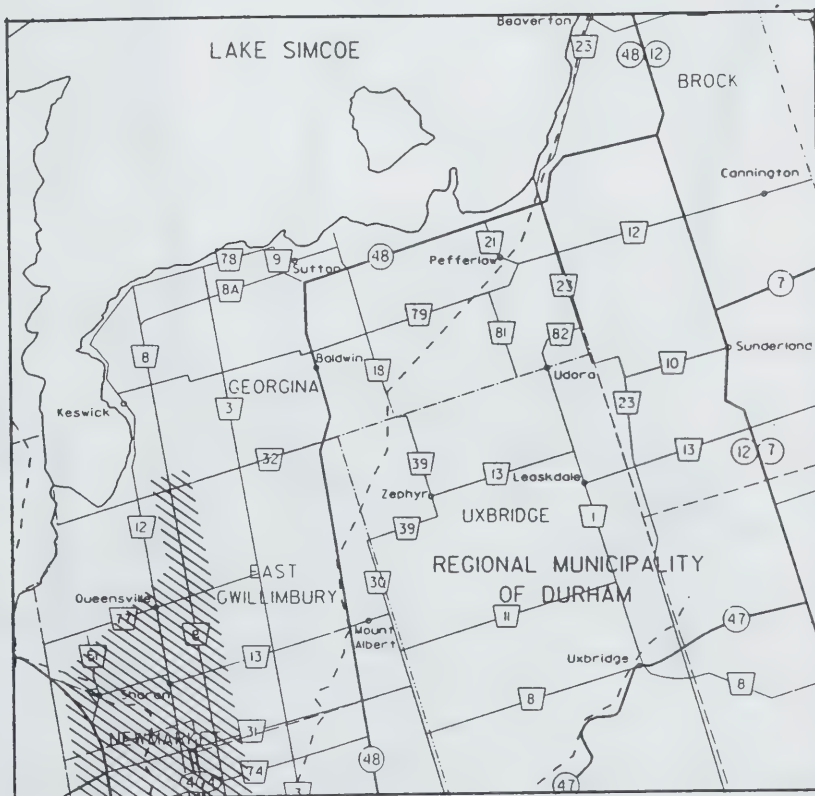
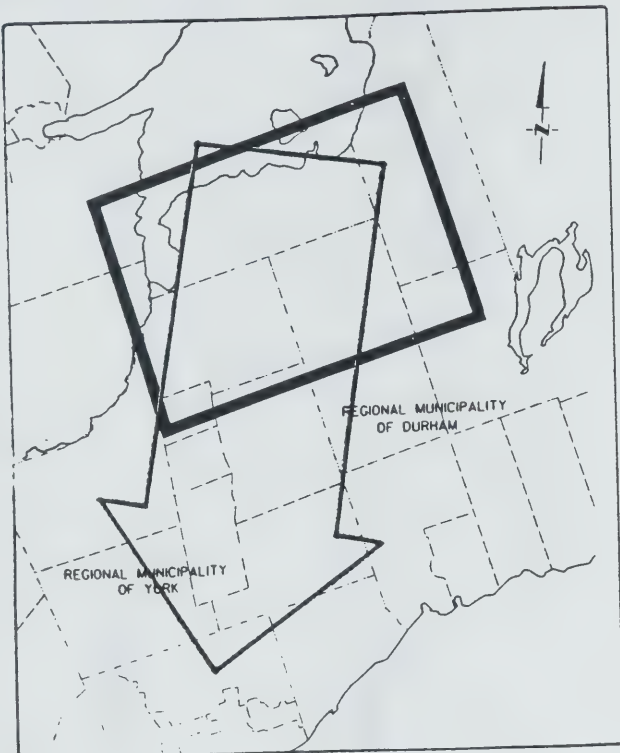
For modeling purposes, the future road network also assumed an extension of Highway 404 north to Queensville Sideroad. This extension does not preclude the assessment of alternatives to the undertaking; the extension was incorporated in the base road network to enable travel patterns in the northern portions of the study area to be modeled more accurately.

The future transit network included proposed expansions of GO Transit and TTC service presently being considered.

The impacts of the forecasted traffic volumes on the future road network is congestion on much of the network, as illustrated in Exhibit 3.5. Further transportation improvements are therefore required to reduce the impacts of forecasted commuter traffic volumes on the transportation network in northern York and Durham Regions during weekday morning and afternoon peak periods.

#### **Existing Conditions - Recreational Trips**

The nature of long-distance recreational travel between south-central Ontario and areas north and east of Lake Simcoe favours roadway-based travel modes. The principal routes for traffic traveling between south-central Ontario and areas north and east of Lake Simcoe are the Highway 400 corridor around the west side of Lake Simcoe, and Highways 12 and 48 around the east side of the Lake. Exhibit 3.6 illustrates traffic volumes from areas north and east of Lake Simcoe, to south central Ontario, on a typical summer Sunday (1991 data).

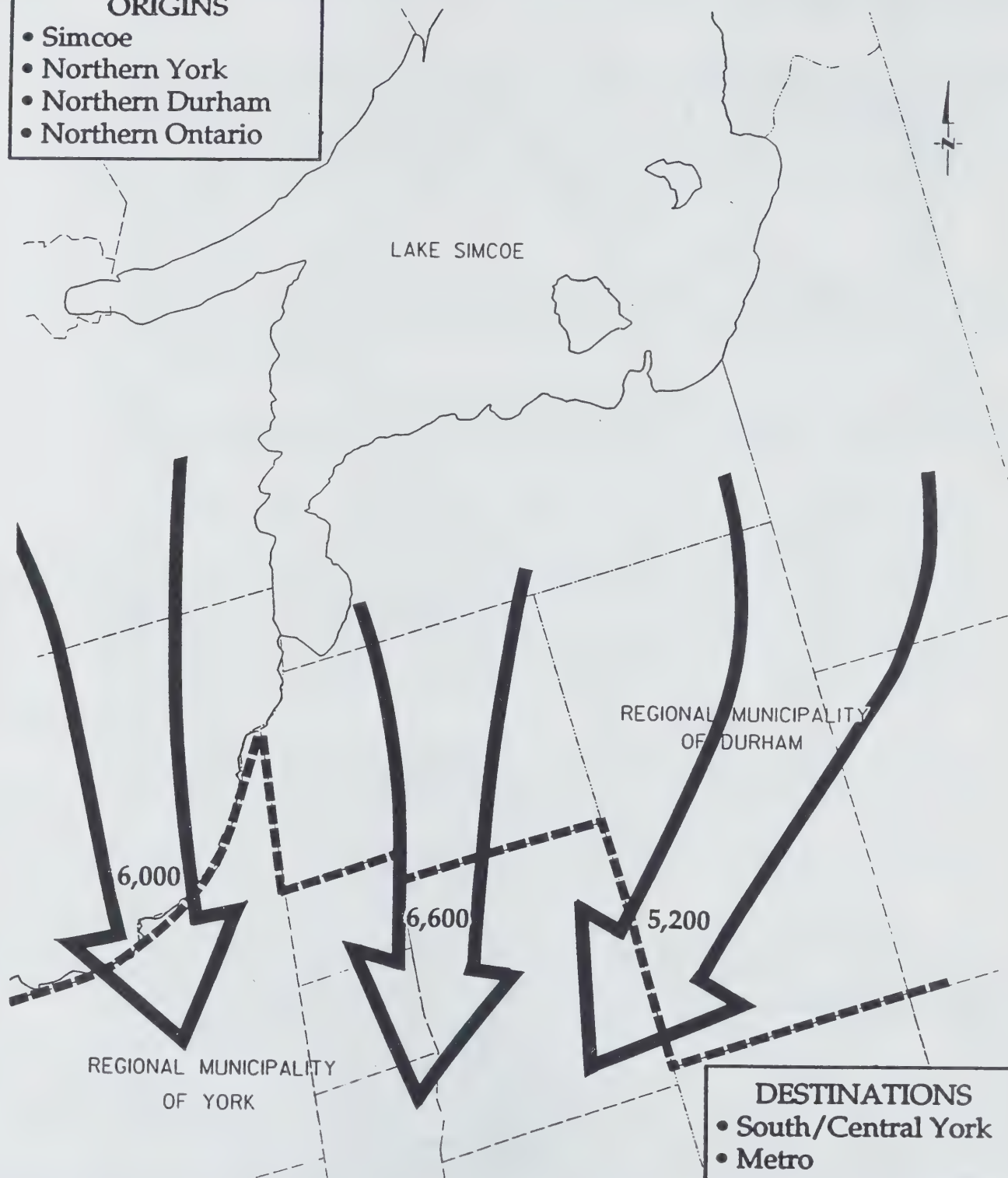


## TRAFFIC OPERATIONS ON EXISTING ROAD NETWORK (1990 AM PEAK HOUR)

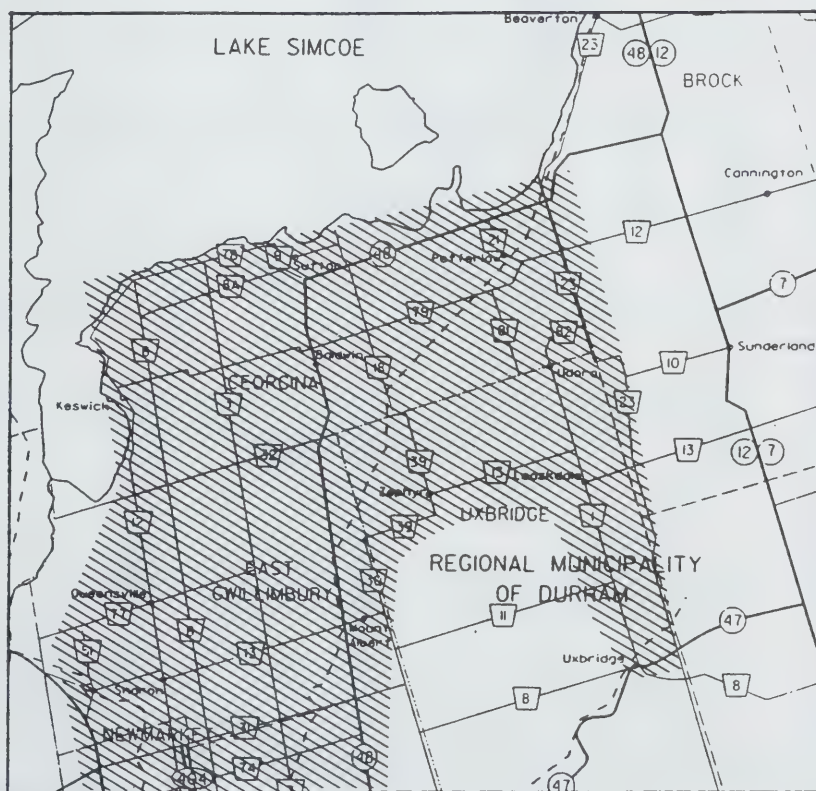
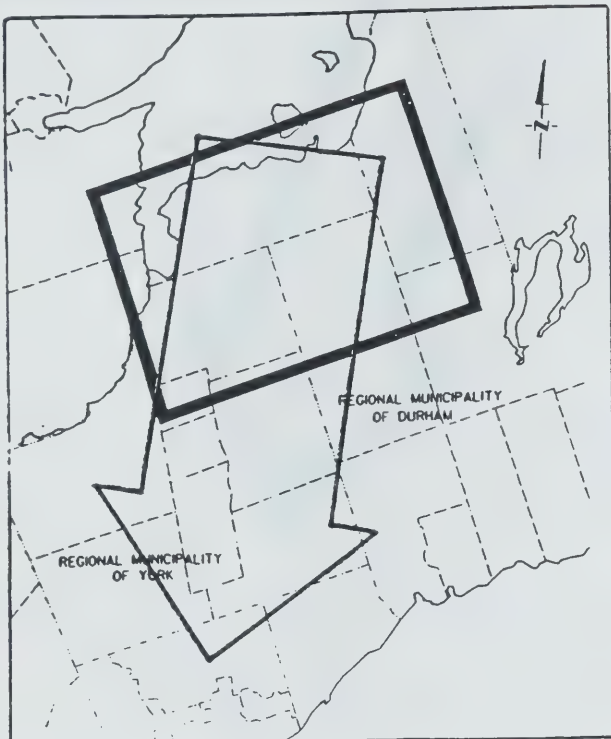


### ORIGINS

- Simcoe
- Northern York
- Northern Durham
- Northern Ontario

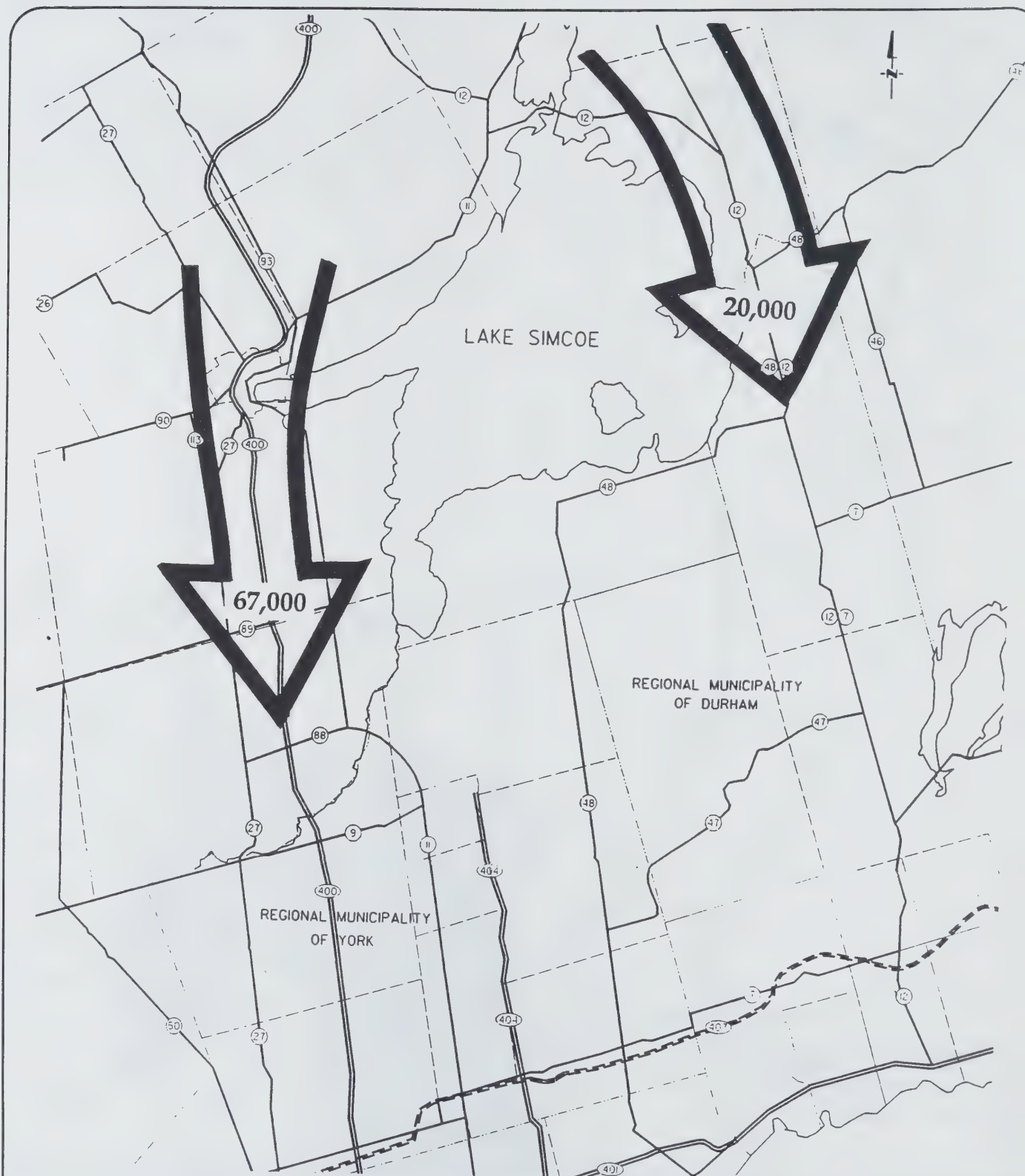


FORECASTED WEEKDAY MORNING PEAK HOUR TRIPS (2011)



AREA WITH ROADS OPERATING  
AT OR NEAR CAPACITY

## TRAFFIC OPERATIONS ON FUTURE ROAD NETWORK (2011 AM PEAK HOUR)



# RECREATIONAL TRAFFIC VOLUMES AROUND LAKE SIMCOE (1991 SUMMER SUNDAY-DAILY)

 **Ontario**  
Ministry of Transportation

 **COLE  
SHERMAN**

## **HIGHWAY 404 EXTENSION** Davis Drive to Highway 12

Route Planning Study and Environmental Assessment

EXHIBIT

3.6



The Highway 400 corridor around the west side of Lake Simcoe operates at capacity during weekend peak periods (typically Friday and Sunday afternoons). Along the east side of the lake, Highway 48 and Highway 12 are two-lane highways providing arterial service to portions of York and Durham Regions, and serving long-distance traffic between south-central Ontario and areas north and east of Lake Simcoe. Highway 48 intersects Highway 12 east of Pefferlaw, and again south of Georville. The two-lane roadway between these two junctions is designated as Highway 12/48. This merger of four traffic lanes to two lanes reduces capacity in the Highway 12 corridor to that of a single two-lane highway.

### **Future Conditions - Recreational Trips**

Projected southbound recreational traffic volumes between areas north and east of Lake Simcoe and south-central Ontario during peak periods are shown in Exhibit 3.7 (2011 data). These projections were based on estimates of growth in recreational and seasonal accommodation (i.e. cottages, hotel rooms and campsites) provided by municipalities north of the GTA.

Capacity deficiencies around the east side of Lake Simcoe will result in traffic congestion on the highway network during weekend peak periods (Exhibit 3.8). Highways 12 and 48 are the only provincial highway facilities serving the recreational traffic traveling around the east side of Lake Simcoe. At the southeast corner of Lake Simcoe, where Highways 12 and 48 merge to become a single two-lane highway, the capacity of this roadway is insufficient to meet the needs of the forecasted recreational traffic volumes.

Long-distance traffic will likely overflow onto the local road network, creating other transportation network problems:

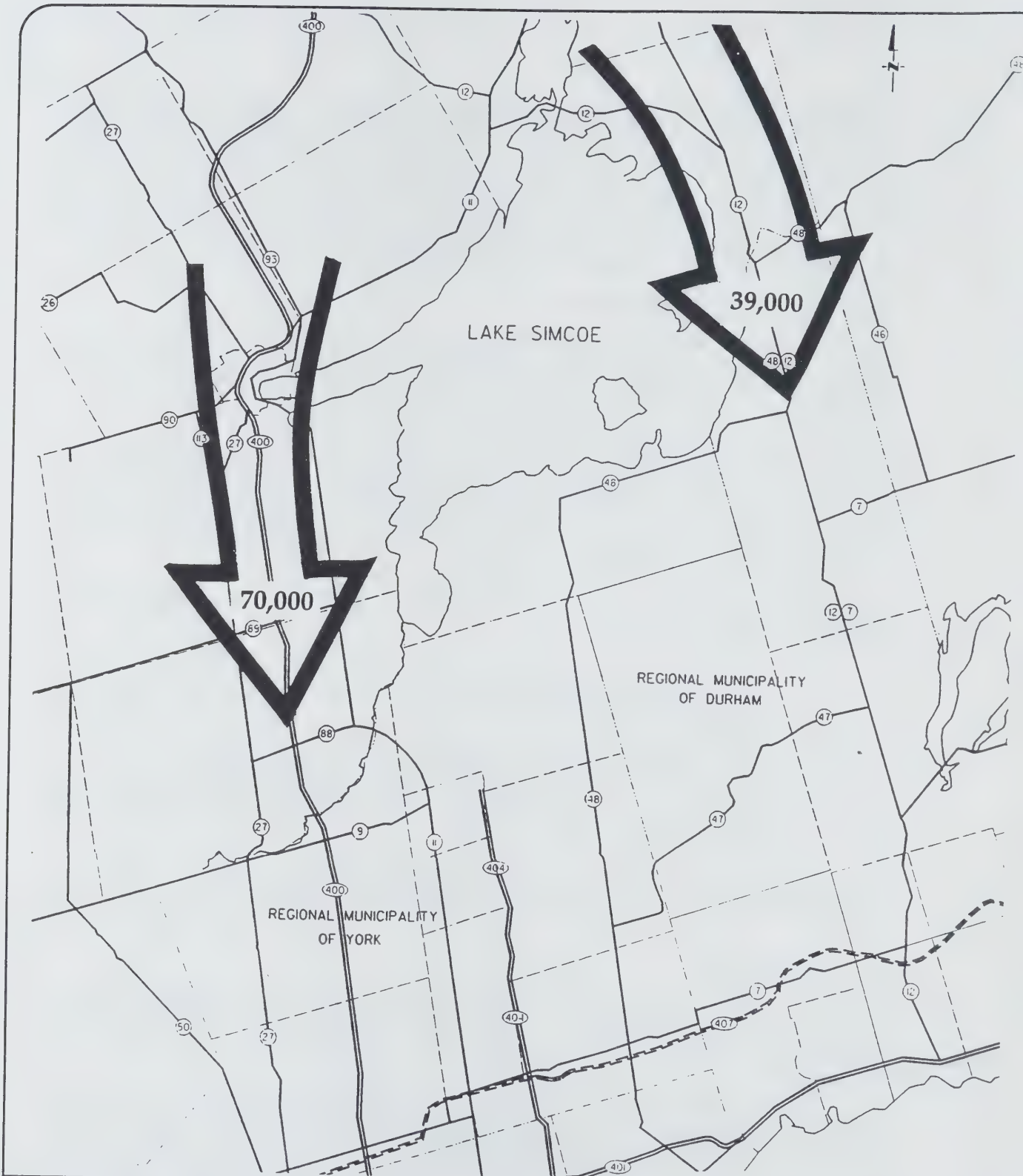
- Regional roads are not generally designed and maintained to standards required for high-speed, long-distance traffic. This creates operational, safety and maintenance concerns.
- Regional roads serve as local access roads. The mix of slower-moving and turning traffic with high-speed through traffic also creates safety concerns.
- The regional road network is discontinuous for east-west through travel across northern York and Durham Regions. This reduces transportation efficiency for long-distance movements.

Transportation improvements are therefore required to address the capacity deficiencies in the transportation network to serve forecasted recreational traffic around the east side of Lake Simcoe.

### **3.1.2 Opportunity**

Transportation improvements are required in northern York and Durham Regions to address transportation network deficiencies associated with forecasted commuter and recreational travel needs.

In recognition of increasing development pressures in northern York and Durham Regions, the long-term transportation needs of this area were assessed to define and designate the property or right-of-way which may be required as early as possible, so that adequate property can be set aside for transportation improvements prior to it being developed or otherwise constrained any further.



**FORECASTED RECREATIONAL TRAFFIC VOLUMES AROUND LAKE SIMCOE  
(2011 SUMMER SUNDAY - DAILY)**

**Ontario**  
Ministry of Transportation

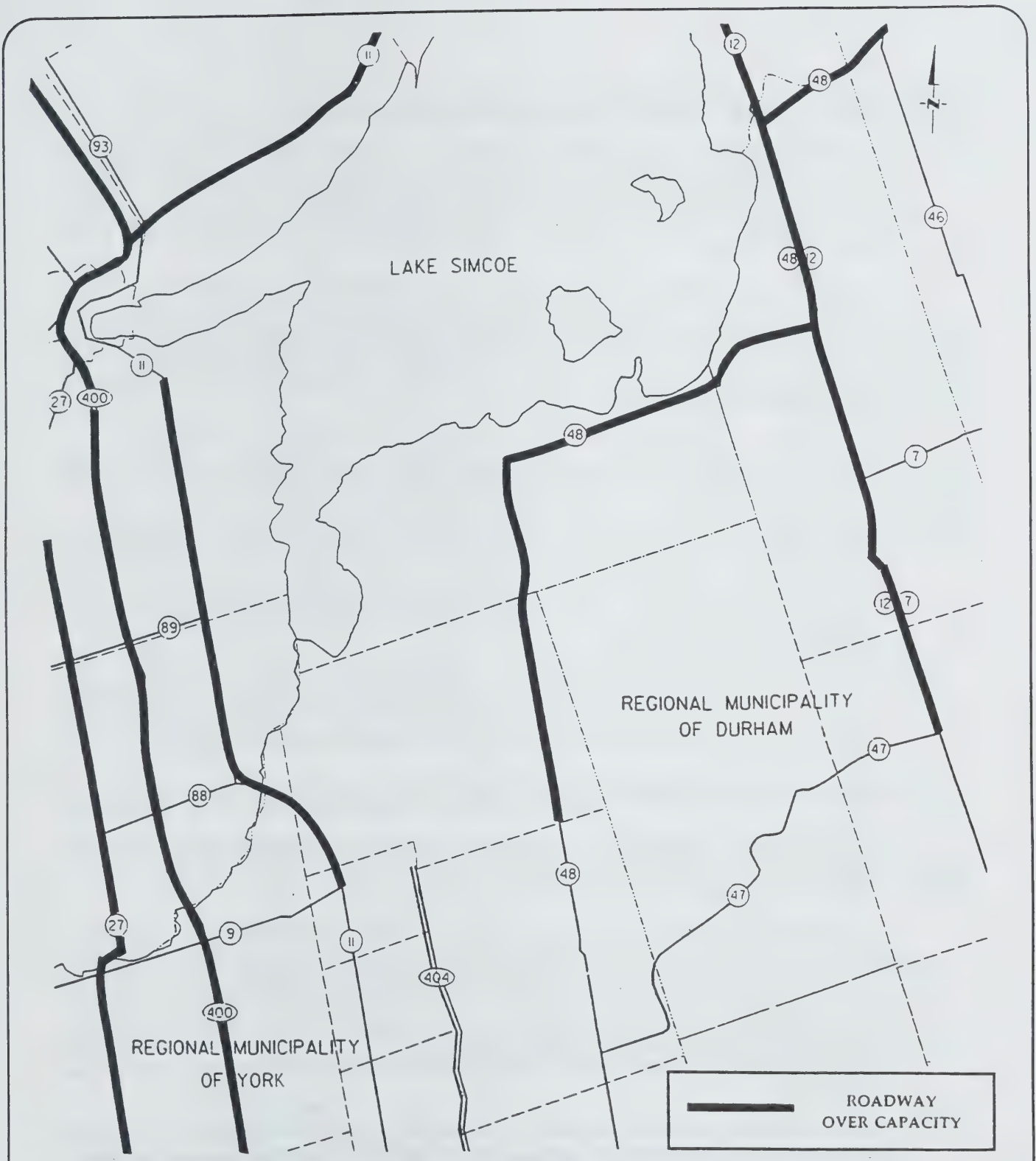
**COLE, SHERMAN**

**HIGHWAY 404 EXTENSION**  
Davis Drive to Highway 12

Route Planning Study and Environmental Assessment

**EXHIBIT**

**3.7**



**TRAFFIC OPERATIONS ON FUTURE HIGHWAY NETWORK  
(2011 SUMMER SUNDAY PM PEAK HOUR)**

**Ontario**  
Ministry of Transportation

**CS** COLE, SHERMAN

**HIGHWAY 404 EXTENSION**

**Davis Drive to Highway 12**

Route Planning Study and Environmental Assessment

**EXHIBIT**

**3.8**



### 3.2 RATIONALE AND DESCRIPTION OF STUDY ANALYSIS AREA

The study analysis area was generally centred on the northern portions of York and Durham Regions, in particular, along the south shoreline of Lake Simcoe. The urban areas along the lake were identified in the Official Plans as where most of the growth will occur over the next thirty years (to 2021), and where the need for transportation improvements will be the greatest.

Transportation modeling based on population and employment growth projections indicated that the northern limit of the commutershed for the Greater Toronto Area (including southern and central York Region) in year 2021 will extend to the Beaverton area in the extreme north portion of Durham Region, and include all the urban areas along the south shore of Lake Simcoe in York Region. This commutershed will be supported by significant employment growth in central and southern York Region.

The analysis area, therefore, for the consideration of alternatives to address the transportation network capacity deficiencies associated with commuter traffic incorporated almost all of York Region, and northern and central Durham Region.

For recreational traffic destined to areas north and east of Lake Simcoe, opportunities for improving capacity deficiencies were considered in the two existing highway corridors around Lake Simcoe: Highway 400 west of Lake Simcoe, and Highways 48 and 12 around the east side of Lake Simcoe. Alternatives in other corridors (e.g. Highway 35/115) were considered to be too far from the existing corridors to generate reasonable alternatives, due to the significant out-of-way travel they would require.

Combining these two traffic types, therefore, yielded the study analysis area for considering alternative solutions to the problem incorporating York Region, central and northern Durham Region, as well as the existing transportation corridors around the east and west sides of Lake Simcoe.

### 3.3 RATIONALE, DESCRIPTION AND ASSESSMENT OF "ALTERNATIVES TO" CONSIDERED

The Environmental Assessment Act requires that alternatives to the undertaking be considered. Alternatives to the undertaking are defined as functionally different ways of addressing the problem.

The Ministry of Environment and Energy's Interim Guidelines on Environmental Planning and Approvals advises proponents to conduct an initial screening of alternatives to the undertaking to determine which alternatives are reasonable. The guidelines state that it is important for the proponent to clearly document the reasons why an alternative is not reasonable. For this study, the judgment of reasonableness was based on the ability of the alternative to resolve the transportation problem identified. Alternatives which passed this test were carried to an evaluation which considered the advantages and disadvantages of each alternative to the environment.

The transportation problem in northern York and Durham Regions to be addressed in assessing alternatives to the undertaking is a deficiency in the capacity of the transportation network to accommodate current and forecasted commuter and recreational travel demands.

Four types of alternatives to the undertaking were assessed for their reasonableness in addressing this problem:

- a) Do Nothing
- b) Manage Transportation Demand
- c) Non-Roadway Solutions-Improve or Introduce New Facilities, and
- d) Roadway Solutions-Improve or Introduce New Facilities.

**a) Do Nothing**

Do Nothing usually means to maintain the status quo of transportation infrastructure and services (as of 1993), with no significant changes or actions being taken to either manage demand, expand infrastructure, or improve operations. For this study, the Do Nothing alternative assumes all currently planned transportation infrastructure improvements to be undertaken by York Region, Durham Region and MTO will take place.

The problem statement outlined the serious transportation deficiencies that will still exist in the study area even with all the planned road expansion activities. The Do Nothing alternative, therefore, does not reasonably resolve the transportation problems in the study area. The Do Nothing alternative, however, was compared to the Technically Preferred Route.

**b) Manage Transportation Demand**

Managing transportation demand includes the implementation of measures to sufficiently reduce, shift, or eliminate transportation demand, such that improvements to transportation infrastructure/operation within the study area are not required.

Several ways in which transportation demand can be managed include:

- spreading peak period demand over longer periods (e.g. through encouragement of staggered work hours or goods delivery);
- shifting existing/future transportation origin/destination patterns to areas where fewer transportation infrastructure/operation problems, and/or where better transportation opportunities exist (e.g. encouraging development in target areas);
- eliminating any increase in transportation demand (e.g. through caps on development);
- directly managing the use of the existing transportation system so as to maintain demand at a level balanced with capacity (e.g. through metered access); and,
- reducing vehicular demand by using fewer vehicles to carry the same (or more) amount of people and goods (e.g. through encouraging High Occupancy Vehicle use and/or discouraging one-occupant vehicle use).

Transportation demand is a product of provincial, regional and municipal development policies. Development areas inherently create traffic demand based on the need to travel through, within and between such areas. MTO's mandate is to provide for the effective use of provincial transportation facilities to address the needs of regions and municipalities.

Transportation demand between northern York and Durham Regions and south/central York Region and Metro Toronto exceeds the capacity of the network. York and Durham Regions have indicated that development in the northern portions of the regions will continue. As development in northern York and Durham Regions continues, transportation demand will increase and transportation problems will worsen, as discussed in Section 3.1.

For the purposes of this study, managing transportation demand, therefore, is not a reasonable alternative to the undertaking, and was eliminated from further consideration.

**c) Non-Roadway Solutions- Improve Existing or Introduce New Facilities**

Transportation facilities or mode types may be improved or introduced to expand the capacity of the transportation system, offer a new choice to the user, and contribute to the resolution of the stated problems/opportunities. Non-roadway solutions would be air-, rail-, or water-based, requiring the associated infrastructure such as airports, railways, and lake/river/canal systems respectively. Rail-based solutions could be further subdivided into interurban passenger rail (VIA, GO Transit trains), intra-urban passenger rail (subway, light rail and freight rail (CN, CP).

As discussed previously, the vast majority of trips in York and Durham Regions are made using the automobile (refer to Figure 3.1). The scattered distribution of origins and destinations throughout York and Durham Regions and Metro Toronto, and the modal transfer requirements likely to be necessary are not conducive to developing and sustaining large transit ridership.

Improvements to non-roadway based facilities would therefore not adequately resolve the transportation problems in northern York and Durham Regions. This alternative was not carried forward for further consideration.

**d) Roadway Solutions- Improve Existing or Introduce New Facilities**

Roadway solutions include improvements to existing transportation services and facilities, and the introduction of new services and facilities. Such solutions include:

- roadway operation improvements
- roadway infrastructure improvements
- roadway infrastructure additions; and,
- roadway-based modal additions

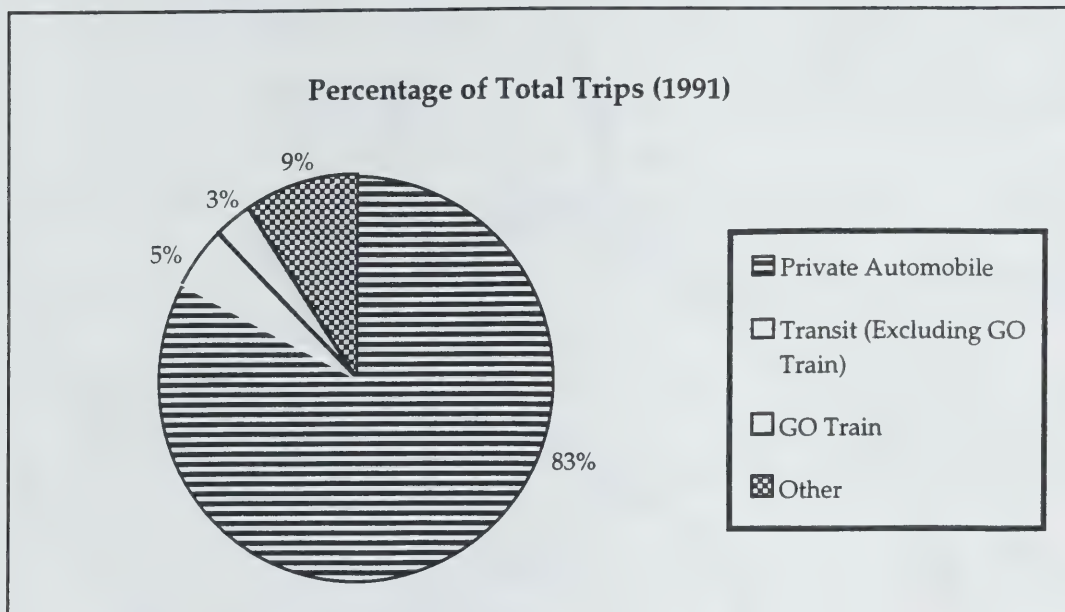
**Roadway Operation Improvements**

This option includes improving the operations of the existing road system by using one-way roads, advanced traffic signaling, and electronic traffic management techniques, such that an adequate level of service is provided to road users.

This alternative is most successful when addressing local traffic deficiency problems in urban areas. Such improvements are not reasonable for this project because of the size of the rural road network in the study area and the negative effects such operation improvements would have on local traffic. Therefore, these types of alternatives were eliminated from further consideration.



**Figure 3.1 - Existing Modes of Daily Travel in York and Durham Regions**



Source: 1991 Transportation Tomorrow Survey, Data Management Group

### Roadway Infrastructure Improvements

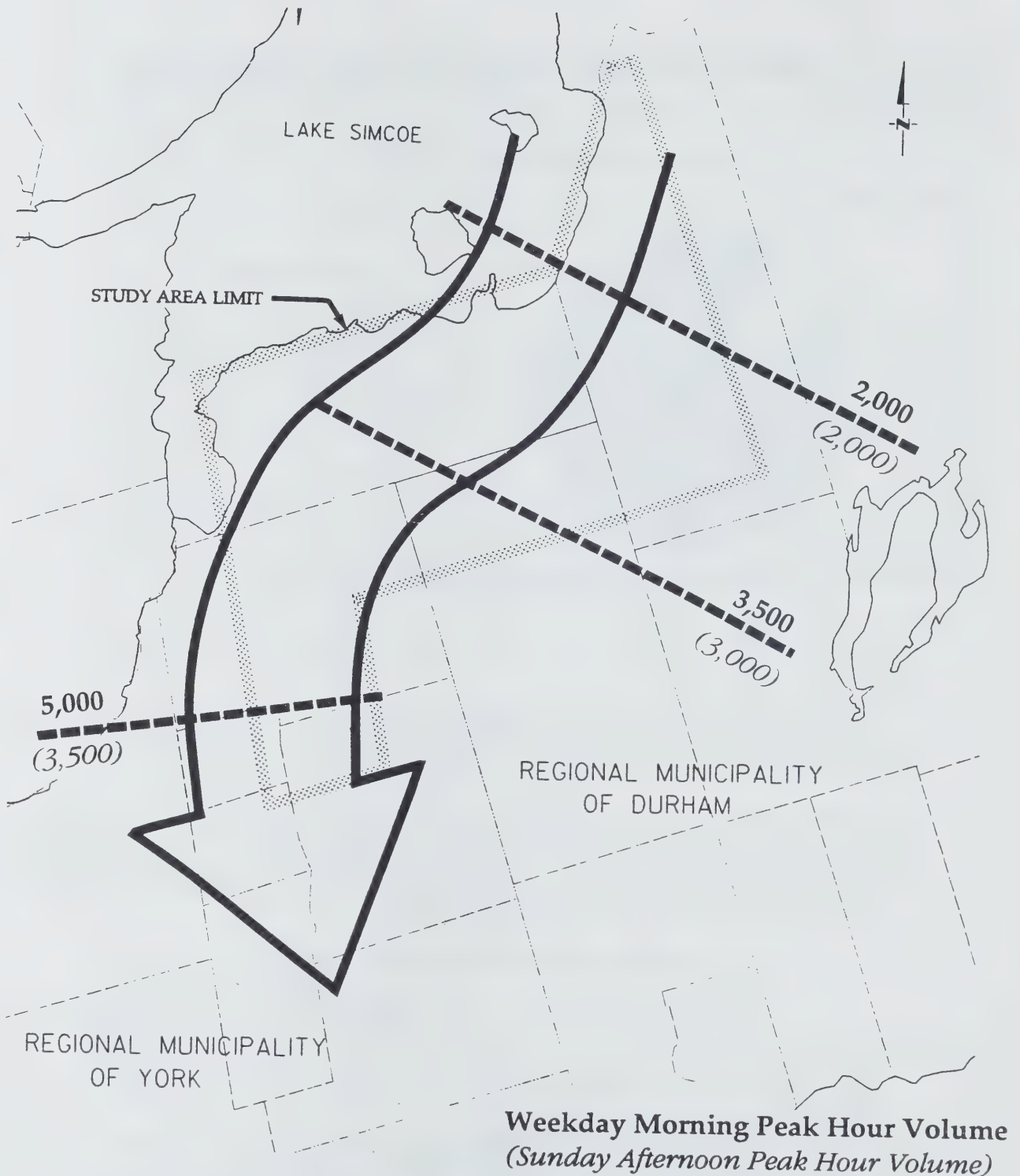
This alternative includes improving capacity through widening, twinning, grade separation, spot improvements, etc., to upgrade one or more existing roads and thereby expand capacity and improve operations.

The projected commuter and recreational traffic demands in excess of future road network capacity across northern York and Durham Regions are shown in Exhibit 3.9. The following table shows the capacities provided by various types of roadway facilities. To accommodate the future traffic demands of this magnitude, widening of several regional roads and/or provincial highways in the study area would be required.

### Comparison of Capacities of Highway Facilities

| Facility  | Capacity*/Lane<br>(veh/hr) | Total Capacity/<br>Direction<br>(veh/hr) |
|---|----------------------------|--|
| 1. Four Lane Divided Controlled Access Highway<br>(Interchanges)<br>Example = Hwy. 404 south of Davis Drive | 1,800                      | 3,600                                    |
| 2. Four Lane Divided Highway (Right in -Right out)<br>Example = Hwy. 11 (between Newmarket &<br>Bradford)   | 1,050                      | 2,100                                    |
| 3. Four Lane Undivided Highway<br>Example = Hwy. 7 (through Markham)  | 900                        | 1,800                                    |
| 4. Two Lane Highway (Limited Access)<br>Example = Hwy. 12   | 800                        | 800                                      |

\* Standard capacities for planning/modeling purposes



**PROJECTED TRAVEL DEMAND IN EXCESS OF FUTURE (2011)  
HIGHWAY NETWORK**

Widening regional or local roads to accommodate long-distance through traffic is not a reasonable alternative to the undertaking because these roads primarily serve local trips. Mixing long-distance through and local traffic creates other transportation network concerns:

- Regional roads are not generally designed and maintained to standards required for high-speed, long-distance traffic. This creates operational, safety and maintenance concerns.
- Regional roads serve as local access roads. The mix of slower-moving and turning traffic with high-speed through traffic also creates safety concerns.
- The regional road network is discontinuous for east-west through travel across northern York and Durham Regions. This reduces transportation efficiency for long-distance movements.

Highways 12 and 48 are the only provincial highways serving long-distance through traffic between south-central Ontario and areas north and east of Lake Simcoe. Improving Highway 48 to a four-lane controlled access facility would not solve the transportation network problems west of the Highway 48 corridor because of the out-of-way travel which would be required.

Similarly, improvements to the Highway 12 corridor would not alleviate capacity deficiency problems in areas west of the Highway 12 corridor because of the significant out-of-way travel which would be required to access this facility.

Improvements to the Highway 400 corridor were not considered since this alternative would not address the capacity deficiency problems for commuter traffic in northern York and Durham Regions.

Since roadway infrastructure improvements do not adequately resolve the transportation problems in northern York and Durham Regions, this alternative was not carried forward for further analysis.

#### Roadway Infrastructure Additions

This alternative includes introducing a new roadway in all or part of the study area, thereby adding new capacity to the existing transportation system. Such a roadway could take many forms (freeway, highway or arterial), would have several alignment options, and have countless design alternatives (structures, intersections, grade separations, cross-section, mitigating features, etc.).

Three corridor alternatives were investigated to determine the best location for a new facility in the study area: the Highway 12 corridor north from Highway 407, the Highway 48 corridor north from Highway 407, and an extension of Highway 404 north from the existing terminus at Davis Drive.

As discussed previously, providing additional roadway capacity in the Highways 12 and 48 corridors would do little to alleviate the capacity deficiency problems in areas west of each corridor, because of the out-of-way travel that would be required.



A new facility connecting to the terminus of Highway 404 at Davis Drive and crossing east-west through the study area to Highway 12 would address several transportation problems in the study area. Such a facility would:

- provide sufficient capacity to alleviate capacity deficiencies on north-south roadways in the western portion of northern York Region;
- provide sufficient capacity to alleviate east-west and north-south capacity problems for commuters traveling across northern York and Durham Regions to access Highway 404;
- improve transportation efficiency through northern York and Durham Regions; and,
- provide additional roadway capacity to the Highway 12 corridor around the east side of Lake Simcoe for long-distance traffic traveling between south-central Ontario and areas north and east of Lake Simcoe.

Roadway additions located in a corridor extending from the existing terminus of Highway 404 to Highway 12 were carried forward for further consideration.

#### Roadway-Based Modal Additions

This option includes improving existing or introducing new roadway-oriented transit, such as buses and van pools. Improving the use of transit reduces the number of vehicles on the road network, thereby reducing the demand for roadway capacity improvements.

Presently 85% of all trips made in all of York Region (including urban areas such as Richmond Hill, Markham and Newmarket) are made using private automobiles, while only five percent of these trips are made using roadway-based transit. In northern York and Durham Regions, where service is not as readily available, the percentage of trips made using transit is even less.

Future transit service improvements in northern York and Durham Regions could not reasonably be expected to increase the portion of trips made to southern/central York Region and Metropolitan Toronto by transit sufficiently to reduce the demand for additional roadway capacity. This alternative would therefore be ineffective in addressing the transportation problems of northern York and Durham Regions. Roadway-based modal additions were therefore not carried forward for further consideration.

#### **e) Summary of Assessment of Alternatives to the Undertaking**

The transportation problem in northern York and Durham Regions addressed in assessing alternatives to the undertaking is a deficiency in the capacity of the transportation network to accommodate current and forecasted commuter and recreational travel demands.

Of the four types of alternatives assessed for their ability to resolve these problems, only "Roadway Solutions" was identified as a reasonable alternative. Of the four roadway solutions assessed, only "Roadway Infrastructure Additions" was initially identified as a reasonable alternative. The alternatives will be located in a corridor extending from the existing terminus of Highway 404 at Davis Drive to Highway 12.

### 3.3.1 Consultation

The statement of problem and opportunity outlined in Section 3.1 and the assessment of alternatives to the undertaking outlined in Section 3.2 were documented in the draft EAP. Section 2.2.3 outlines the review process implemented to obtain comments from stakeholders on this document.

Revisions were made to the statement of problem/opportunity and the assessment of alternatives to the undertaking. These changes, however, were primarily initiated to reflect the new travel demand information received after the draft EAP was published, and did not necessarily reflect the comments made by stakeholders on the draft EAP.

The statement of problem/opportunity in the draft EAP primarily addressed the problem of east-west "out-of-way" travel and provincial highway network contiguity. Upon review of the new travel demand information, it was determined that the transportation problems in the study area changed from east-west to north-south in nature, due to forecast increases in commuter travel needs between the primarily residential areas of northern York Region and the major employment centres in southern York Region and Metropolitan Toronto.

The revised statement of problem/opportunity was documented in the Final EAP, which was made available for stakeholder review. The comments received as a result of this review indicated strong support for the revised problem/opportunity statement and assessment of alternatives to the undertaking (refer to Appendix 5).

## 3.4 RATIONALE AND DESCRIPTION OF ALTERNATIVE METHODS

As discussed in Section 3.3, alternatives which passed the test of reasonableness, based on the ability of the alternative to resolve the transportation problem identified, were carried to an evaluation which considered the advantages and disadvantages of each alternative to the environment. Of the four types of alternatives assessed for their ability to resolve these problems, only "Roadway Solutions" was identified as a reasonable alternative. Of the four roadway solutions assessed, only "Roadway Infrastructure Additions" was initially identified as a reasonable alternative. The alternatives will be located in a corridor extending from the existing terminus of Highway 404 at Davis Drive to Highway 12.

Each alternative will be a controlled access divided highway, with a design speed of 120 km/hr. Design parameters controlling the horizontal and vertical alignment for the facility will be consistent with MTO's *Geometric Design Standards for Ontario Highways*. The basic minimum right-of-way width will be 100 metres, with additional width required at interchanges and grade separations.

Direct access to and from the highway will be restricted to the interchange locations. Interchanges will be provided at crossings of major roads in the existing transportation network, and at other locations as required to improve community access. Other roads will be grade separated or closed at the right-of-way limits. Rail crossings will also be grade separated.

### 3.5 DESCRIPTION AND RATIONALE FOR STUDY AREA BOUNDARIES - CORRIDOR AND ROUTE PLANNING

The study area chosen to generate and assess alternative methods is shown on Exhibit 3.10. The definition and the rationale for the selection of the study area limits are shown on Exhibit 3.11. These limits were based upon forecasted transportation deficiencies and the assumed extent of any effects of the proposed alternatives.

The study area includes the northern portions of York and Durham Regions, incorporating all or part of the following municipalities:

- Town of Newmarket
- Town of East Gwillimbury
- Town of Georgina
- Township of Uxbridge
- Township of Brock





## STUDY AREA

# HIGHWAY 404 EXTENSION

## Davis Drive to Highway 12

### Route Planning Study and Environmental Assessment

EXHIBIT  
3.10

| Boundary | Description  | Rationale   |
|----------|--|---|
| East     | Lot 16/17 of Brock Township between the south Township border and Thirteenth Concession, and Lot 7/8 of Brock Township between First and Ninth Concessions   | The east limit is based on the general objective of connecting the Highway 404 extension into Highway 12. The study area is extended east to Lot 7/8 in Brock Township to allow for a reasonable range of alternatives within and parallel to the Highway 12 Corridor.  |
| South    | A line extending along Durham Regional Roads 13 and 39 between Highway 7/12 and Concession IV in East Gwillimbury, Concession IV between York Regional Road 77 and Davis Drive, and along Davis Drive, between Concession IV and Concession I. | Analysis of transportation network operations with future traffic volumes indicates that a roadway addition along or south of York Regional Road 77/Durham Regional Road 39 would not resolve the transportation problems in northern York and Durham Regions. The existing terminus of Highway 404 serves as the south limit in the western portion of the study area.   |
| West     | York Regional Road 12 between Davis Drive in Newmarket and the south shore of Lake Simcoe.   | The general objective of the Highway 404 extension is to address transportation deficiencies in northern York and Durham Regions. The shore of Lake Simcoe (Cook's Bay) represents the west limit in the northern portion of York Region. Given the location of the existing terminus of Highway 404, Leslie Street was assumed to be the westernmost limit for developing alternatives which would reduce inefficient out-of-way travel in northern York and Durham Region. Extending Highway 404 northward from its present terminus would likely impact Leslie Street, given the proximity of the road to the existing highway corridor. The westerly limit of any proposed improvements, therefore, is Leslie Street. |
| North    | A line extending, more or less, along the south shoreline of Lake Simcoe between the Cook's Bay east shoreline and the north junction of Highways 12/48.   | The north limit is located in proximity to future development areas in northern York and Durham Regions. This limit was assumed to represent the limit of the GTA commutershed within the planning horizon (2021). Alternatives developed within this limit will address the future commuter traffic problem. Although it is recognized that there may be a need for improvements to transportation facilities to address recreational travel needs (refer to Exhibit 3.8), this problem will be addressed in a future study, since there is less concern with diminishing opportunities for protecting for a long-term solution in this portion of the study area.   |

## RATIONALE FOR STUDY AREA LIMITS FOR CORRIDOR AND ROUTE PLANNING

# HIGHWAY 404 EXTENSION Davis Drive to Highway 12

Route Planning Study and Environmental Assessment







## 4.0 CORRIDOR PLANNING AND ROUTE PLANNING

The goal of route generation was to generate reasonable route alternatives by eliminating areas unsuitable for highway development early in the process. To accomplish this, a six step process was employed (see Exhibit 4.1).

Step 1: Identify Significant Study Area Features

Step 2: Identify Corridor Opportunities

Step 3: Refine Corridor Opportunities

Step 4: Generate Route Alternatives

Step 5: Analyze Route Alternatives

Step 6: Select Preferred Route

### 4.1 IDENTIFY SIGNIFICANT STUDY AREA FEATURES

This step involved the collection of secondary source data to identify significant features throughout the study area. Data collected was grouped into natural, community and agricultural features. Detailed descriptions of existing and future conditions were documented in Technical Reports which are available for review, upon request, at MTO and libraries in the study area.

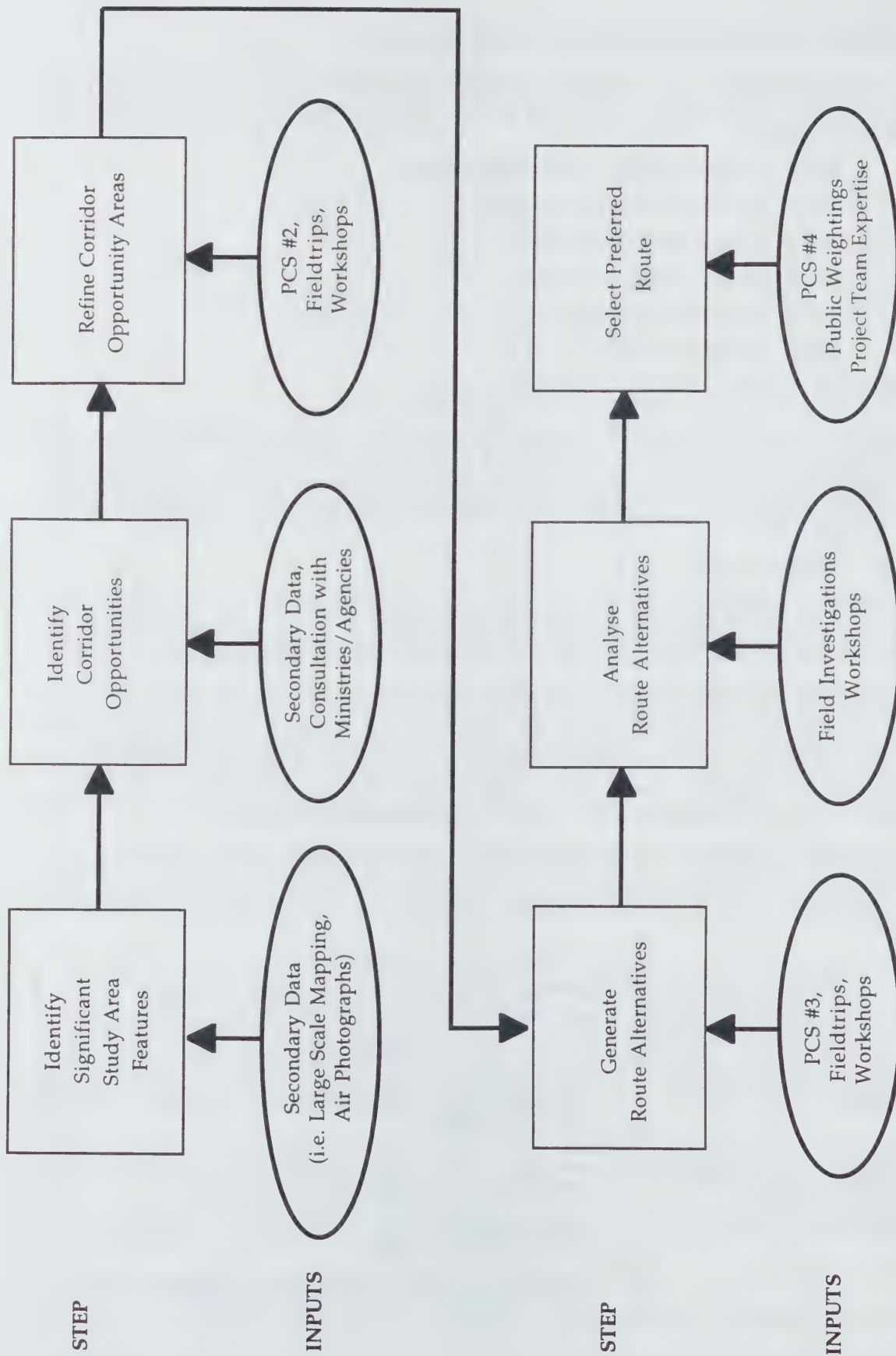
#### 4.1.1 Natural Features

In addition to previously published sources, secondary source information was obtained from the Ministry of Natural Resources, the Ministry of Environment and Energy, the Lake Simcoe Region Conservation Authority and the Region of York to identify significant natural features.

An ecosystem approach was used to identify significant natural features. This approach recognized that an effect on one part of the system can impact all of the other parts. This approach integrates natural and physical factors in an effort to define the attributes of a system, understand how the ecosystem functions and how it is linked to neighbouring ecosystems. In large part, it was based on watersheds, although it recognized that terrestrial features may have larger system units which can cross watershed boundaries.

This approach is consistent with that used to develop a Greenland Strategy for the York Region Official Plan. The criteria used to identify significant natural features in the study area were developed based on this ecosystem approach. These criteria are described in the following table:

| Criteria Used to Identify Significant Natural Features for Corridor Planning |   |
|--|---|
| Criteria   | Rationale   |
| Presence of/or Linkages to Significant Habitat Units                         | <ul style="list-style-type: none"><li>• have regulatory interest; high known or suspected habitat value (e.g., wetlands/ANSIs/ESAs/large woodlots &gt;20 ha); difficult to mitigate</li></ul>   |
| Presence of Significant Sensitive Aquatic Habitat                            | <ul style="list-style-type: none"><li>• permanent flowing headwater tributaries; known spawning areas; difficult to mitigate; high habitat value</li></ul>  |
| Presence of Granular Soils   | <ul style="list-style-type: none"><li>• potential for interference of ground water movement as it affects streams and wetlands.</li><li>• highly permeable soils (sand and gravel) potentially allow for rapid contaminant movement to ground water</li></ul> |





The study area lies within the Lake Simcoe drainage basin and includes the watersheds of the Maskinonge River as well as portions of the Black River, Pefferlaw Brook, Uxbridge Brook, Beaver River and Talbot River watersheds. Most of the study area lies within the Simcoe Lowlands Physiographic Area.

The topography of the area is flat to gently rolling. Soil thickness is variable across the study area but is generally in the 40 to 60 m range in the southern and western portion of the study area. It generally thins to the northeast where the underlying bedrock is less than 6 m from the surface.

Five major river systems (Maskinonge River, Black River-Zephyr Creek, Pefferlaw Brook-Uxbridge Brook, Beaverton River, Talbot River) and the associated wetlands and forests dominate the natural environment landscape of the study area. These natural areas provide habitat for a large number of plants and animals, including provincially and regionally significant species. In addition, these natural features provide important social functions for both rural and urban residents.

Federal, Provincial and Municipal policies are in place to protect natural features from being unduly impacted. The objectives of these policies are to minimize or prevent the loss of the natural and social functions provided by natural features and systems.

The significant natural features in the study area are shown on Exhibit 4.2. Detailed descriptions of these natural features are documented in the Natural Environment Technical Report, which is available for review, upon request, at MTO and libraries in the study area.

#### **4.1.2 Agricultural Features**

Agricultural resources were identified by combining the land use system data with the soil capability classifications to define areas of varying levels of agricultural activity (see Exhibit 4.3).

Provincial and municipal policies are in place which recognize agricultural land as a non-renewable resource and advocate the preservation of quality land for food production. The quality of an agricultural area is generally given by the Canada Land Inventory of soil capability for agriculture; Class 1-4 soils are considered to be of most value.

Agricultural features in the study area are further documented in the Socio-Economic Environment Technical Report, which is available, upon request, at MTO and libraries in the study area.

#### **4.1.3 Community Features**

Existing development within the study area is generally comprised of urban areas (residential, commercial, industrial, institutional and recreational uses), rural hamlets, and agricultural uses.

The study area is comprised of five local municipalities (the Towns of Newmarket, East Gwillimbury and Georgina and the Townships of Uxbridge and Brock) within two regional municipalities (York and Durham). Each of these municipalities have approved Official Plans which govern development.

Urban areas in and around the study area defined in the municipal and regional Official Plans include: Keswick, Sutton, Pefferlaw, Mount Albert, Sharon, Beaverton, Sunderland, Uxbridge, and Cannington. The latter two are located in close proximity, but outside, the defined study

area limits. It is the general policy of these municipalities to focus the majority of growth in the urban areas.

Geographically smaller and less populated rural settlement areas exist throughout the study area. Some of these rural settlements include areas recognized through local and regional OP's as hamlets. Generally, the designation of an area as a hamlet is intended to retain the rural character of an area while permitting limited growth primarily through infilling.

Provincial and municipal policies are in place to administer the boundaries, size, growth rate, phasing and uses within settlement areas. The objectives of these policies are to provide focal points of living and employment activity in the area, and to strengthen and foster the heritage and economic activity of communities.

The significant community features in the study area are shown on Exhibit 4.4 and documented in the Socio-Economic Environment Technical Report, which is available for review, upon request, at MTO and libraries in the study area.

#### **4.1.4 Cultural Features**

No cultural features were identified as being significant for the purpose of corridor generation because specific historical and archaeological sites could be avoided during route generation.

The significant cultural features in the study area are documented in the Cultural Environment Technical Report, which is available for review, upon request, at MTO and libraries in the study area.

## **4.2 CORRIDOR PLANNING**

### **4.2.1 Description and Rationale for Corridor Generation Criteria**

Once the significant natural, social and agricultural features were identified (Exhibit 4.5), it was apparent that there were no opportunities to locate route alternatives where all impacts could be avoided. Possible crossing locations of the study area natural features were identified to focus corridor and route generation in areas where impacts to the natural environment would be reduced (i.e. across narrow sections or along edges of large natural features).

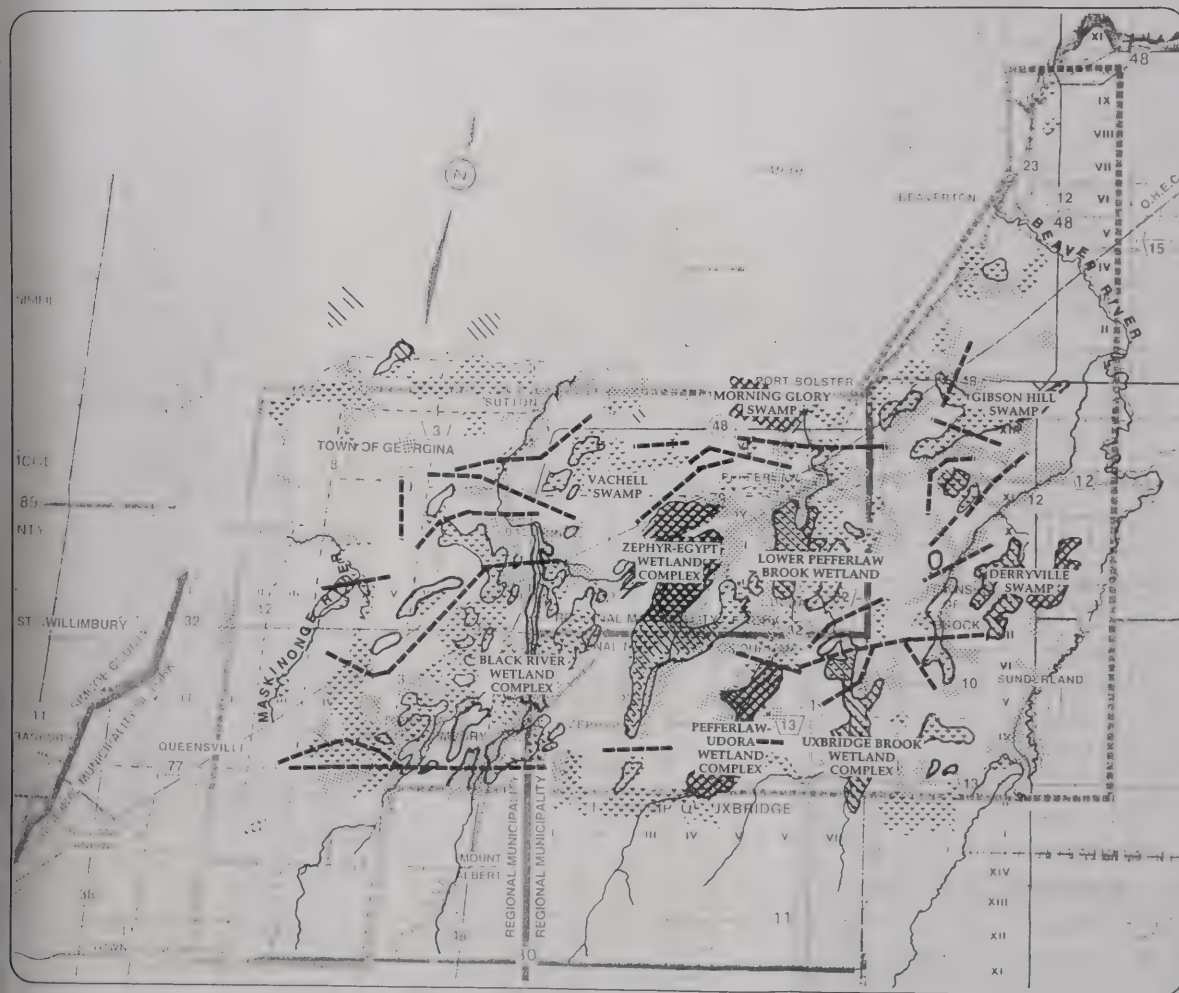
In addition to the proposed crossing locations, the following generation criteria were developed to identify corridor opportunities in the study area:

#### **NATURAL FEATURES**

- Minimize the severing of core natural areas,
- Reduce the extent of crossing impacts,
- Locate corridors in areas where natural features have been disturbed or disrupted by a previous (existing) crossing.

#### **COMMUNITY FEATURES**

- Minimize impacts to densely populated communities,



## SIGNIFICANT NATURAL FEATURES

### LEGEND

PROVINCIAL  
SIGNIFICANT  
WETLAND



AREA OF NATURAL OR  
SCIENTIFIC INTEREST



ENVIRONMENTALLY  
SIGNIFICANT AREA



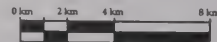
WOODLOT



GREENLANDS



POTENTIAL CROSSING

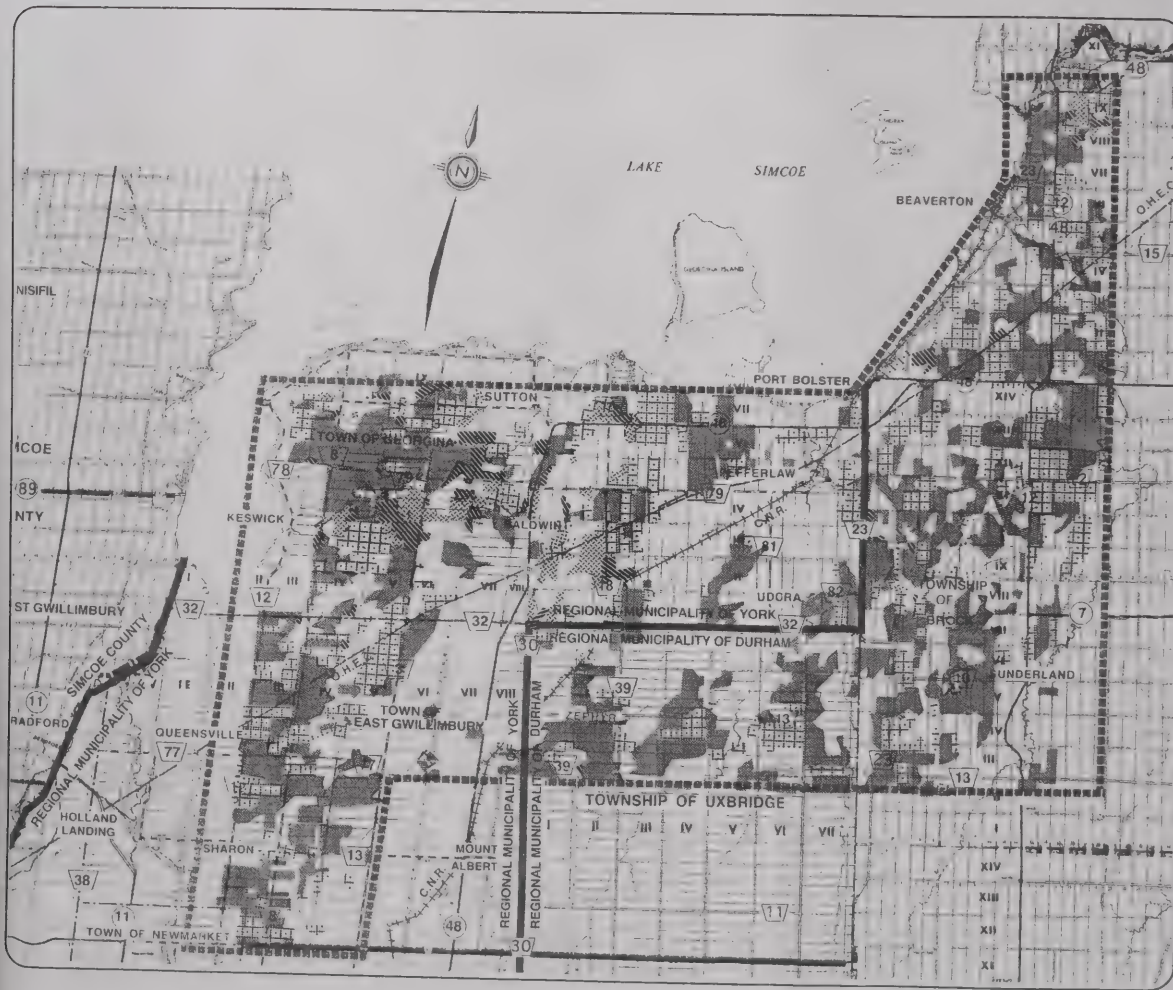


## HIGHWAY 404 EXTENSION

Davis Drive to Highway 12  
Route Planning Study and  
Environmental Assessment







## AGRICULTURAL LAND USE

### LEGEND

CLASS 1 & CLASS 2 SOILS  
INTENSIVE USES



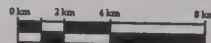
CLASS 3 & CLASS 4 SOILS  
INTENSIVE USES



CLASS 1 & CLASS 2 SOILS  
NON-INTENSIVE USES



CLASS 3 & CLASS 4 SOILS  
NON-INTENSIVE USES



## HIGHWAY 404 EXTENSION

Davis Drive to Highway 12  
Route Planning Study and  
Environmental Assessment

 **Ontario**  
Ministry of Transportation

EXHIBIT

4.3







## GENERAL LAND USE

### LEGEND

RURAL HAMLETS



URBAN AREAS



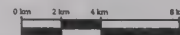
URBAN SERVICE  
BOUNDARY



SECONDARY PLAN  
BOUNDARY



AGRICULTURAL AREAS  
(includes rural settlements)



## HIGHWAY 404 EXTENSION

Davis Drive to Highway 12










Route Planning Study and  
Environmental Assessment





## SIGNIFICANT STUDY AREA FEATURES

### LEGEND

- EXISTING DEVELOPMENT AREA 
- FUTURE COMMUNITY BOUNDARY 
- GROWTH MANAGEMENT STUDY AREA 
- REGIONAL FORESTS 
- AGRICULTURAL AREA 
- NATURAL AREA 
- POTENTIAL CROSSING 
- EXISTING LANDFILL SITE 
- CLOSED LANDFILL SITE 



## HIGHWAY 404 EXTENSION

Davis Drive to Highway 12  
Route Planning Study and  
Environmental Assessment





## AGRICULTURAL FEATURES

The areas of agricultural development are continuous and homogeneous throughout the study area and therefore could not be used as a means to identify corridor opportunities. It was determined that route alternatives would have to be generated so as to reduce impacts on individual farm operations by respecting property and field lines.

### 4.2.2 Identify Corridor Opportunities

By essentially connecting the possible crossing locations previously identified in a continuous and direct manner for the length of the study area, corridor opportunities were identified as illustrated in Exhibit 4.6. The corridor opportunities were of sufficient width to reduce impacts to key study area features and allow flexibility in route generation. These corridor opportunities were presented to the public at the second set of Consultation Sessions (June 1994).

Previous studies carried out to address the transportation problems in northern York and Durham Regions identified a corridor along Ravenshoe Road. Such a corridor was not considered in this study because it did not meet the corridor generation criteria. Specifically, a corridor along Ravenshoe Road would sever the large Black River and Zephyr-Egypt Wetland complexes. While Ravenshoe Road represents an existing disturbance of these nature features, the increased disturbance associated with a four-lane controlled access highway along with service roads required to maintain local access, would result in severe impact to the core areas of these features.

### 4.2.3 Consultation - Identify Corridor Opportunities

Prior to the second set of Public Consultation Sessions, meetings were held with the Ministry of Natural Resources, the Ministry of Agriculture, Food and Rural Affairs, the Lake Simcoe Regional Conservation Authority, the External Team and Municipal Staff and Council (see Appendix 7 for minutes). The only specific comment related to corridor generation came from the Ministry of Natural Resources, which noted that in a previous study, MTO proposed to construct a roadway in the Ravenshoe Road corridor (see Section 4.2.2).

Corridor opportunities were presented to the public at the second set of Public Consultation Sessions. The comment sheets distributed at these Consultation Sessions asked the following specific question regarding the Corridors:

Do you agree with the identified opportunity areas for route generation?

Sixty of the seventy-two responses received (83%) agreed with the opportunity areas identified (for details, refer to Appendix 5).

### 4.2.4 Refine Corridor Opportunity Areas

Corridor Opportunities were initially identified based on secondary source information. Additional information on the natural and socio-economic environments was obtained and/or verified through one or more of the following methods:

- Air photo interpretation;
- Field investigations;
- Discussions/meetings with local interest groups;
- Public Consultation Sessions (two sets);
- Workshops;
- Community meetings;
- Field Trips with area residents/interested individuals;
- Kitchen table meetings; and
- Key informant interviews.

Details of the additional information is outlined in the Technical Reports available, upon request, at MTO and libraries in the study area.

Refinement to the corridors were made in 13 areas (refer to Exhibit 4.7), reflecting the comments received on the initial set of corridors, and additional information obtained on the study area.

### 4.3 ROUTE PLANNING

#### 4.3.1 Description and Rationale for Route Generation Criteria

Route design objectives were developed to generate route alternatives within the corridors and are shown in Exhibit 4.8. These design objectives reflected limitations on route design due to engineering design, existing legislation or policies, or sensitivities of specific environmental features in the study area.

The design objectives served as a framework for which route alternatives and subsequent route refinements were developed. This framework provided consistency and traceability for this aspect of the study.

Design parameters for the proposed controlled access facility were obtained from MTO's *Geometric Design Standards for Ontario Highways*.

#### 4.3.2 Generate Route Alternatives

Based on the data gathered to date on the corridors and corridor refinements (which included secondary data augmented with additional data collection as noted in Section 4.2.4) preliminary route alternatives (Exhibit 4.9) were developed for each corridor and presented to External Team, Municipal Teams, and to the public the third set of Consultation Sessions and second set of Workshops.

Consultation events were held to obtain additional information on significant study area features to further augment the data previously collected and obtain input on the preliminary route alternatives. Additional information on the natural, socio-economic and cultural environments was obtained and/or verified through one or more of the following methods:

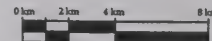
- Air photo interpretation;
- Field investigations;
- Discussions/meetings with local interest groups;
- Public Consultation Sessions (two sets);
- Workshops;
- Community meetings;
- Field Trips with area residents/interested individuals;
- Kitchen table meetings; and
- Key informant interviews.



## OPPORTUNITY CORRIDORS

### LEGEND

CORRIDORS



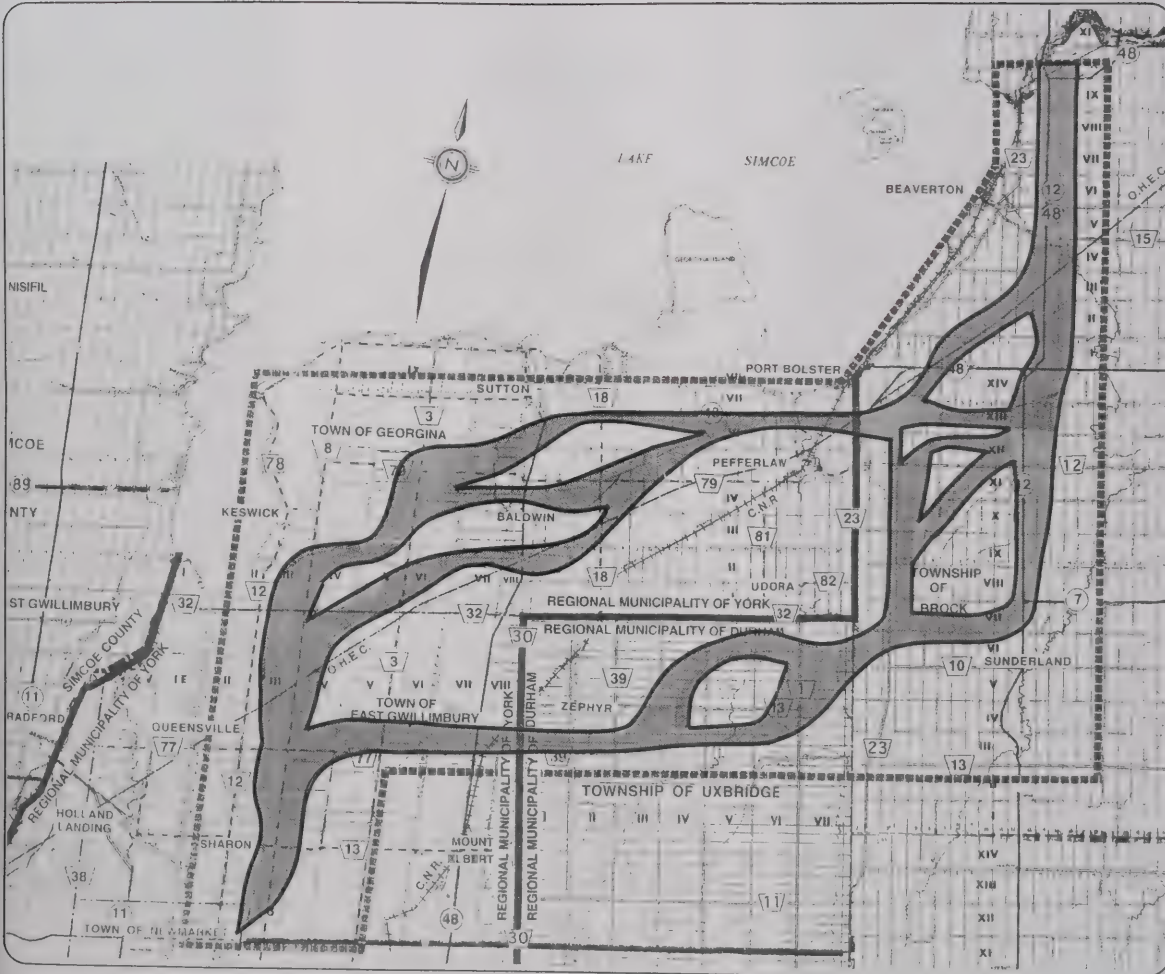
## HIGHWAY 404 EXTENSION

Davis Drive to Highway 12  
Route Planning Study and  
Environmental Assessment

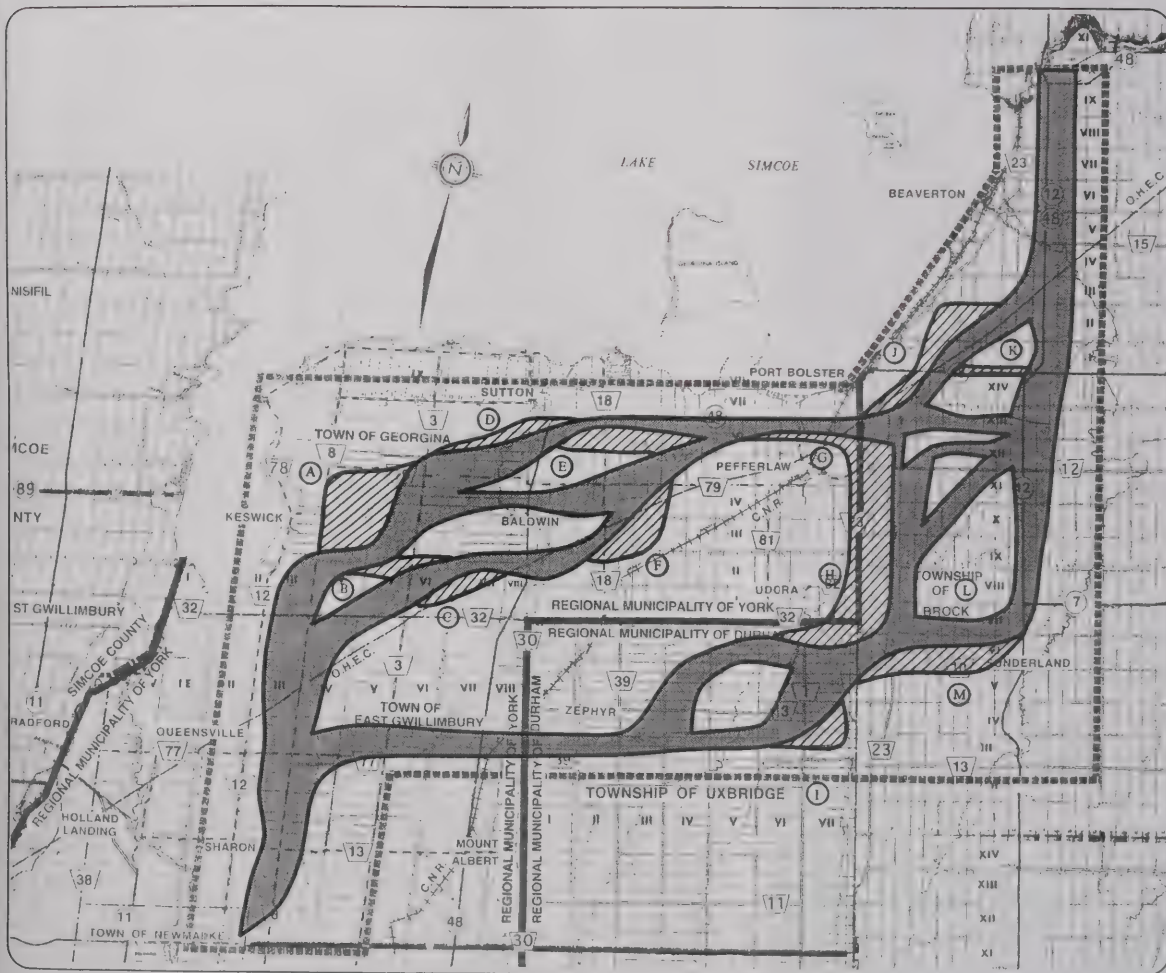
 **Ontario**  
Ministry of Transportation

EXHIBIT

4.6







## REFINEMENTS TO OPPORTUNITY CORRIDORS

### LEGEND

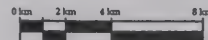
REFINEMENT TO  
ORIGINAL CORRIDORS



ORIGINAL  
CORRIDORS



REFERENCE



## HIGHWAY 404 EXTENSION

Davis Drive to Highway 12

Route Planning Study and  
Environmental Assessment

 **Ontario**  
Ministry of Transportation

EXHIBIT

4.7A





| Map Reference | Reason For Corridor Refinement  |
|---------------|---|
| A             | Refined original corridor boundary to allow alternate distribution of traffic in vicinity of Keswick.   |
| B             | Refined original corridor boundary to minimize agricultural impacts by following border between natural and agricultural areas, and minimizing diagonal severances. |
| C             | Refined original corridor boundary to make use of existing wetland crossing (Ontario Hydro), reducing the impact to the wetland and agricultural operations.        |
| D             | Refined original corridor boundary to reduce impacts to settlement area of Elm Grove.   |
| E             | Refined original corridor boundary to reduce local agricultural impacts by following field lines.   |
| F             | Refined original corridor boundary to reduce local agricultural impacts by following the border between agricultural and natural areas.                             |
| G             | Refined original corridor boundary to reduce impacts to existing development and reduce crossing impacts to Pefferlaw Brook.  |
| H             | Refined original corridor boundary to reduce agricultural community impacts by following the border between natural and agricultural areas.                         |
| I             | Refined original corridor boundary to reduce agricultural impacts by reducing diagonal severances and avoiding high-value agricultural operations.                  |
| J             | Refined original corridor boundary to reduce agricultural impacts by reducing diagonal severances and avoiding high-value agricultural operations.                  |
| K             | Refined original corridor boundary to reduce agricultural impacts by making use of existing road right-of-way (Highway 48).   |
| L             | Removed corridor to avoid impacts associated with two crossings of Vrooman Creek and fragmentation of the valley.   |
| M             | Refined original corridor boundary to avoid high-value agricultural operation and reduce crossing impacts to wetland south of Vroomanton.                           |

# ENGINEERING DESIGN OBJECTIVES

| OBJECTIVE  | RATIONALE  | ASSUMPTIONS  | DEFINITION  |
|--|--|--|---|
| Horizontal and vertical alignments to be consistent with a 120 km/h controlled access freeway.   | MTO standards require a 120 km/h design speed to provide sufficient roadway capacity and reduce potential for accidents. | MTO standards will govern the design of route alternatives.  | A controlled access designation imposes strict controls on permits and the use of frontage lands abutting highways.<br><br>Design Speed is the speed used to identify the necessary geometric criteria for a safe roadway design. Design speed is generally in excess of the posted speed limit, thus affording a factor of safety in roadway design. |
| Generate horizontal and vertical alignments so as to produce an efficient design which considers crossing angles of roads, railways, rivers, etc, and directness of route. | Minimizing route length reduces overall impacts, and improves transportation service by reducing travel time.            | Route length directly relates to amount of overall impact.<br><br>Reducing travel time improves level of transportation service. | Level of Service is a Ministry of Transportation classification system for Ontario roadways which describes the type of traffic service being provided to the travelling public. The classifications are defined in terms of traffic volume, speed and maneuverability.   |

## SOCIAL ENVIRONMENT DESIGN OBJECTIVES

| OBJECTIVE  | RATIONALE   | ASSUMPTIONS  | DEFINITION  |
|--|---|--|---|
| Minimize direct impacts to urban areas and clustered rural settlements.                                | Avoidance of urban areas and clustered rural settlements will decrease the number of people displaced by the highway. | The majority of people that live in the study area reside in either of these settlement areas. | Urban areas represent highly developed areas of human settlement.<br><br>Clustered rural settlements comprise hamlets and other small groupings of residential development. |
| Minimize direct impacts to property by following lot/concession/field lines or existing right-of-ways. | Following property lines minimizes the amount of property required from each property owner.                          | Back lot impacts will minimize social impacts at the individual level.                         | Individual properties identified by municipal tax assessment roles. Field lines identified by aerial photography.   |



## NATURAL ENVIRONMENT DESIGN OBJECTIVES

| OBJECTIVE   | RATIONALE   | ASSUMPTIONS   | DEFINITION   |
|---|---|---|--|
| Minimize impacts to natural areas by either following edges of natural areas and/or crossing natural areas at narrowest location. | Natural areas have regulatory and public interest, are fairly large and uniform, have a known value, and may contain significant species. | The most significant natural areas have been identified and defined.                    | Natural areas include classified wetlands, environmentally significant areas, areas of natural and scientific interest, and local natural areas identified by field investigations and public. |
| Minimize river and stream crossings.  | Water crossings have the potential to alter the waterbody and result in the introduction of sediment into the watercourse.                |   | Water crossings include bridges and culverts.  |
| Minimize impacts to greenland systems.  | Natural areas are linked both in a north-south and east-west direction  | Existing roads and land uses presently do not pose barriers to the movement of animals. | Greenlands are core wetland or forest areas which are linked via other open spaces (e.g. fields or other corridors to adjacent core areas.   |

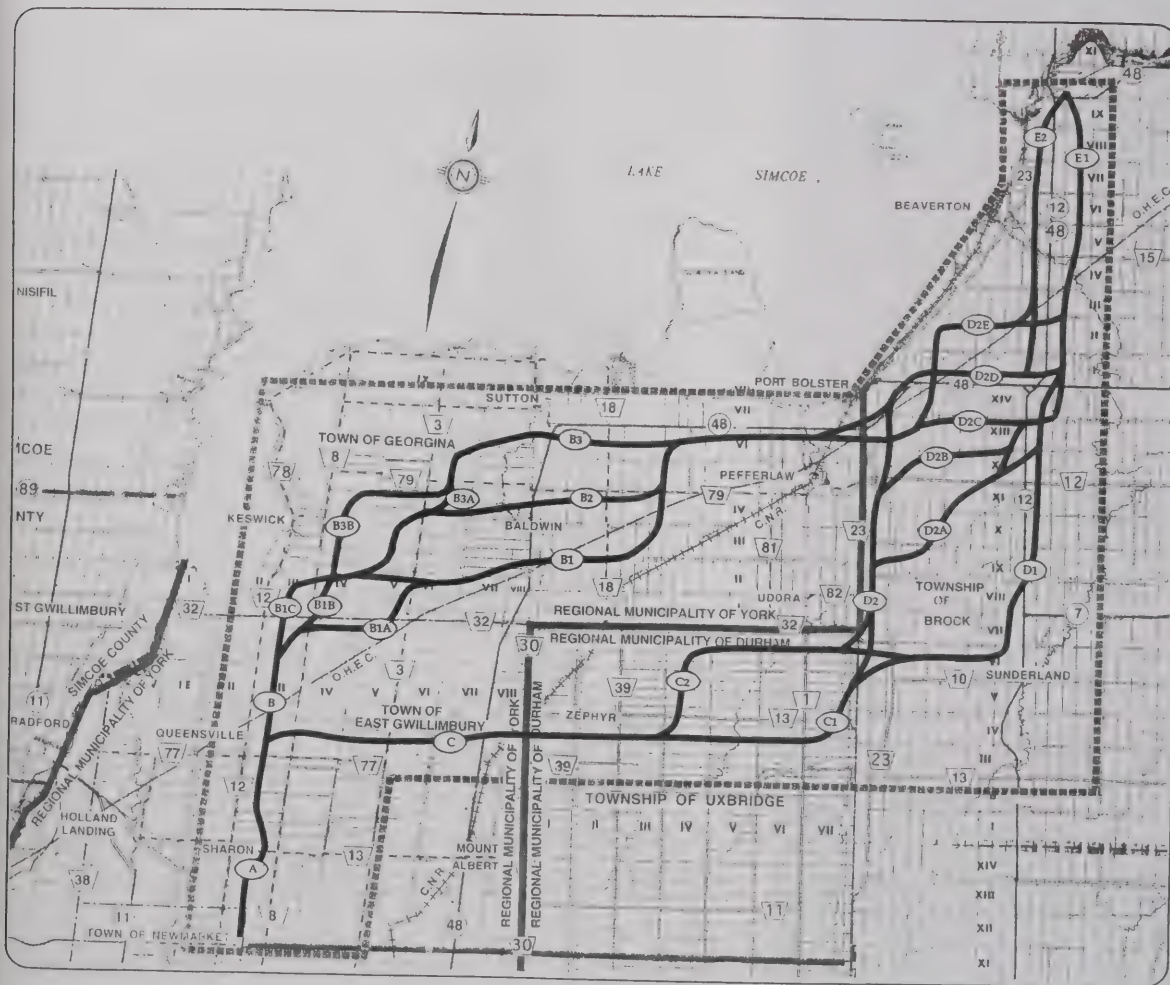
## ECONOMIC ENVIRONMENT DESIGN OBJECTIVES

| OBJECTIVE  | RATIONALE  | ASSUMPTIONS   | DEFINITION  |
|--|--|---|---|
| Follow lot/concession/field lines to avoid dividing viable fields with the highway right-of-way. | Following property lines will minimize the physical disruption to farm operations.                         | Individual properties identified by municipal tax assessment roles. Field lines identified through field survey.    | Lot lines identified by municipal tax assessment roles. Field boundaries identified by aerial photography and site inspections. |
| Minimize impacts to high value, intensive farms.   | High value farms represent areas of greatest potential economic impact and loss of agricultural resources. | Identified by field investigation of crop types and qualitative comparison of capital investment in farm buildings. | Agricultural Value represents capital investment apparent in building and structures.   |

## CULTURAL ENVIRONMENT DESIGN OBJECTIVES

| OBJECTIVE  | RATIONALE  | ASSUMPTIONS   | DEFINITION |
|--|--|---|------------|
| Minimize impact to registered and unregistered cemeteries which have been identified and documented. | Cemeteries have high social and cultural values and therefore should be avoided.   | Known cemeteries are recorded in official documents or have been identified and documented. |            |
| Minimize impacts to known heritage features of high and moderate significance.                       | Heritage features of high and moderate significance are important cultural resources and may be designated under the Ontario Heritage Act. | Heritage features have been identified and documented.                                      |            |
| Minimize impacts to known archaeological features  | Archaeological features are important non-renewable cultural resources.  | Archaeological features have been identified and documented.                                |            |

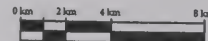




## PRELIMINARY ROUTE ALTERNATIVES

### LEGEND

PRELIMINARY  
ROUTE ALTERNATIVE



## HIGHWAY 404 EXTENSION

Davis Drive to Highway 12  
Route Planning Study and  
Environmental Assessment

 **Ontario**  
Ministry of Transportation

EXHIBIT

4.9





Details of the additional information are outlined in the Technical Reports available for review, upon request, at MTO and libraries in the study area. The information collected at this stage assisted in the development of route refinements and the analysis of the route alternatives.

In all, thirteen route refinements were suggested (Exhibit 4.10). These refinements were implemented where, on balance, an overall reduction of impacts could be achieved. The route design objectives were used as criteria for this evaluation. The evaluation of the route refinements is outlined in Exhibit 4.11.

Incorporating the results of the route refinements evaluation, the final route alternatives carried forward for evaluation are shown in Exhibit 4.12.

#### **4.3.2.1 Generation of Interchanges, Grade Separations and Road Closing Locations**

Route alternatives were developed as having controlled access, whereby all access will be accomplished through interchanges. Crossing roads which are not provided with interchanges will either be provided with a grade separated crossing or will be terminated on either side of the highway. For the purpose of incorporating the impacts associated with interchanges, grade separations and road closings in the analysis and evaluation of route alternatives, the proposed treatment of each crossing road was determined as outlined below:

1. Rationale was developed for siting interchanges, grade separations and road closings. The rationale was based on the jurisdiction (i.e. provincial, regional and local) and function (i.e. mobility and access) of crossing roads.
2. Based on the above, each crossing was assessed in terms of its suitability for an interchange, grade separation or closure.
3. Traffic modeling techniques were utilized, where necessary, to determine impacts to traffic operations on the road network, and changes to crossing treatments were made as required to improve traffic operations.

The interchange, grade separation and road closing locations incorporated in the analysis and evaluation of the route alternatives is shown on Exhibit 4.13. Details of the development of preliminary interchange, grade separation and road closing assumptions are included in Appendix 1.

#### **Interchange Locations**

MTO design standards prescribe that interchanges on controlled access highways should preferably be located at principle roads recognized as major components in the road system which have good continuity and a capability for expansion, if required.

Highway 48, Highway 12 and Highway 7 are key elements in the provincial highway network, serving long-distance high-speed traffic moving through the study area, and connecting to several regional roads within the study area. Interchanges were therefore proposed wherever a route alternative crossed a provincial highway.

In parts of the study area without direct access to provincial highways, regional roads primarily serve to provide mobility between communities within and outside the study area. Regional road crossings were therefore assessed in terms of their suitability for an interchange, subject to consideration of continuity, function and interchange spacing.

Spacing of interchanges was considered due to the potential effect on the operation of the highway. Interchanges spaced too closely reduce traffic operations due to the weaving, accelerating and decelerating traffic characteristic of interchange areas. Spacing interchanges too far apart may create significant out-of-way travel.

Initially, no local roads were assessed as potential interchange locations because they were not considered to be principle roads.

The assessment of the suitability of each regional road crossing for an interchange location is included in Appendix 1. Traffic modeling techniques were used to verify the initial assessment of interchange requirements. The traffic model confirmed that the locations identified in the initial assessment were appropriate (details in Appendix 1).

In addition, the model identified opportunities for additional interchanges in the Keswick area to improve traffic operations on the road network. As a result, an interchange was added on Pollock Road east of Keswick.

### **Route Refinements**

As noted previously (refer to section 4.3.2), refinements to the alignments of several route alternatives were made as a result of comments received from agencies, interest groups and interested individuals. Using the rationale for interchange locations outlined above, regional road crossings on these route refinements were assessed to determine their suitability for an interchange. The assessment of regional road crossings on the route refinements is included in Appendix 1.

### **Grade Separations and Road Closings**

Once the route alignments and interchange locations were finalized, road crossings which were not proposed as interchange locations were assessed to determine the suitability of either providing a grade separation or closing the road at the right-of-way limits. While no specific criteria were developed, this assessment was based on the following considerations:

- road closings impact the area road network and may result in out-of-way travel, based on current traffic patterns;
- grade separations reduce impacts to the road network by maintaining the continuity of the crossing road; however, direct property impacts and construction costs are generally higher than those associated with road closings;
- the level of development along regional roads and local roads outside urban areas is similar;
- regional roads are generally maintained to higher design standards and are more suitable to function as arterial roads than local roads; and,
- local roads are generally designed to provide access to adjacent land uses.

Grade separations were justified at most of the crossing roads to reduce the impacts to the study area road network as well as impacts to access to adjacent land uses. The assessment of road crossings where grade separations were not justified are included in Appendix 1.



#### 4.3.3 Consultation - Generate Route Alternatives

The public was provided the opportunity to review the preliminary route alternatives at the third set of Consultation Sessions (February/ March 1995) and discuss possible refinements with Project Team members. The second set of Workshops (July 1995) provided an opportunity to review the refinements suggested and add any additional refinements.

At the third set of Consultation Sessions, a few individuals noted concern with the level of detail proposed to assess the natural environment impacts for route alternatives. A similar concern was identified by the Project Team earlier. The Project Team's concern primarily related to a lack of a consistent level of detail provided by secondary sources on features throughout the study area. These concerns were addressed as outlined below.

Upon review of the information available to the study from secondary sources and discussion with participants during Public Consultation Sessions, a need for more detail was identified for the following reasons:

- a) much of the pertinent bird data was up to 15 years old and no longer reliable for assessing current locations of some rare species and/or "indicator species";
- b) data was not available consistently across the study area; some areas were well documented, while other areas were very poorly documented and the reliability of some of the data was a concern; and,
- c) significant public concern was expressed via the Public Consultation Sessions and other public contact that reconnaissance level field surveys were insufficient for such a large and diverse study area, and that each route should be physically walked by a biologist.

As a result, a study of breeding birds and amphibians within the corridors was designed to bridge this information gap. Its focus was to: 1) sample breeding species of birds within the corridors (both species and numbers); 2) identify breeding populations of amphibians; and 3) characterize vegetation units. Rare plant species were also noted.

To solicit government and agency comments on the preliminary route alternatives, meetings were held with Ministry of Natural Resources, the Ministry of Agriculture, Food and Rural Affairs, the Lake Simcoe Regional Conservation Authority, the External Team and Municipal Staff and Council. The only specific comments related to route generation came from the Ministry of Natural Resources and York Region (see Appendix 7 for minutes).

MNR reviewed the preliminary route alternatives and identified certain areas of concern with each route alternative. The areas of concern were classified as 1) areas where any concerns could likely be mitigated without relocating the route alternatives, and 2) areas where MNR had serious concerns and relocating the alternative should be investigated. Where possible, MNR suggested route refinements that would reduce impacts to or completely avoid the areas of concerns. The suggested route refinements generally increased impacts to the social economic and/or cultural environments or did not otherwise comply with route design objectives identified in Exhibit 4.8.

The route refinements suggested by MNR which complied with the design objectives were evaluated to determine if an overall reduction of impacts was achieved.

York Region also expressed concern that the alignment of route alternative B3B, along the eastern edge of Keswick, would negatively impact future urban development in Keswick. The Region suggested that the route alternative be relocated as close to Woodbine Avenue as possible to reduce such impacts.



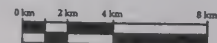
## SUGGESTED ROUTE REFINEMENTS

### LEGEND

PRELIMINARY ROUTE  
ALTERNATIVES



SUGGESTED ROUTE  
REFINEMENTS



## HIGHWAY 404 EXTENSION

Davis Drive to Highway 12

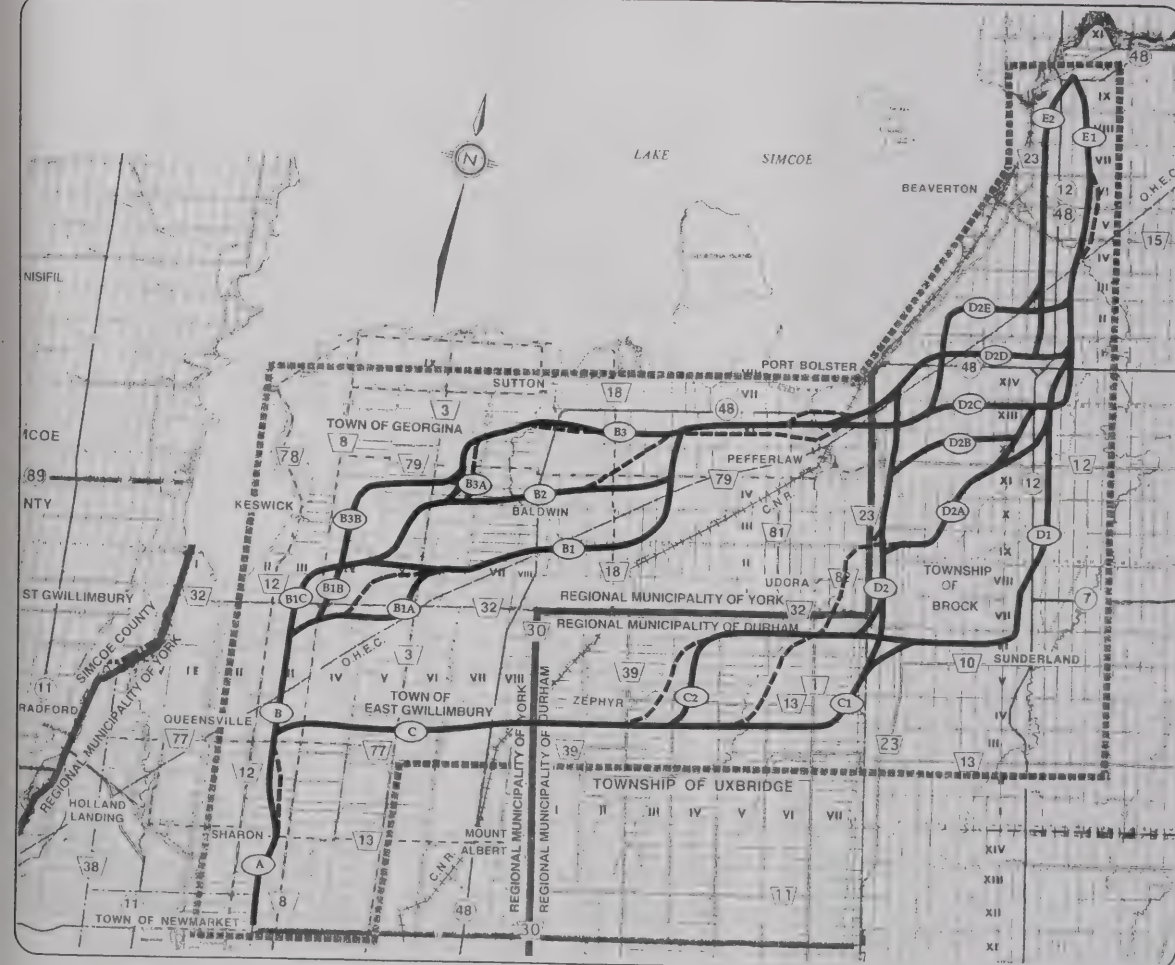
Route Planning Study and  
Environmental Assessment



Ontario  
Ministry of Transportation

EXHIBIT

4.10








|   |  |                                       |
|---|--|---------------------------------------|
| <b>ROUTE: A</b>                           | From: One kilometre south of Doane Road<br>• Location of the alignment at Mt. Albert Road is more or less fixed at the location shown. North of Doane Road, property lines generally coincide at mid-concession.<br>• Alignment passes east of residences on Doane Road at mid-concession. | To: One kilometre north of Doane Road |
| <b>DESCRIPTION OF EXISTING ALIGNMENT:</b> |  |                                       |
| <b>DESCRIPTION OF REFINEMENT:</b>         | • Alignment shifted east of existing alignment to pass further east of residences on Doane Road at mid-concession.   |                                       |
| <b>REASON FOR PROPOSING REFINEMENT:</b>   | • Reduces indirect impacts to residences on Doane Road.<br>• Reduces impacts to wooded wetland area south of Doane Road.   |                                       |

| DESIGN OBJECTIVE   | ASSESSMENT                       | COMMENTS  |
|--|----------------------------------|---|
| <b>ENGINEERING</b>   |                                  |   |
| Horizontal and vertical alignments to be consistent with a 120 km/h controlled access freeway.   | No Significant Change in Impacts |   |
| Generate horizontal and vertical alignments so as to produce an efficient design which considers crossing angles of roads, railways, rivers, etc, and directness of route. | No Significant Change in Impacts |   |
| <b>SOCIAL</b>  |                                  |   |
| Minimize direct impacts to urban areas and clustered rural settlements.  | No Significant Change in Impacts | Minor reduction of indirect impacts to residences at mid-concession on Doane Road.  |
| Minimize direct impacts to property by following lot /concession /field lines or existing right-of-ways.   | Significant Increase in Impacts  | Existing alignment follows property lines as much as possible with four properties impacted: one mid-property severance and three rear of property severances.<br>Proposed alignment does not follow property lines as well as existing alignment, thereby increasing property impacts to five properties in vicinity of Doane Road: three mid-property severances and two rear of property severances. |
| <b>NATURAL ENVIRONMENT</b>   |                                  |   |
| Minimize impacts to natural areas by either following edges of natural areas and /or crossing natural areas at narrowest location.   | No Significant Change in Impacts | Proposed alignment avoids wooded wetland south of Doane Road, but impacts adjacent upland woodland. No significant change in impacts to natural areas south of Doane Road.  |
| Minimize river and stream crossings.   | No Significant Change in Impacts |   |
| Minimize impacts to greenland systems.   | No Significant Change in Impacts | Proposed alignment has similar linkage severance impacts.   |
| <b>ECONOMIC ENVIRONMENT</b>  |                                  |   |
| Follow lot /concession /field lines to avoid dividing viable fields with the highway right-of-way.   | No Significant Change in Impacts | Existing alignment minimizes impacts to viable fields by following property lines as much as possible; four farm operations impacted.<br>Proposed alignment impacts five agricultural operations; no significant difference in impacts to viable fields.  |
| Minimize impacts to high value, intensive farms.   | No Significant Change in Impacts | Both alignments impact sod farm south of Doane Road.  |
| <b>CULTURAL ENVIRONMENT</b>  |                                  |   |
| Minimize impact to registered and unregistered cemeteries which have been identified and documented.   | No Significant Change in Impacts |   |
| Minimize impacts to known heritage features of high and moderate significance.   | No Significant Change in Impacts |   |
| Minimize impacts to known archaeological features  | No Significant Change in Impacts |   |

|                    |  |
|--------------------|--|
| <b>CONCLUSIONS</b> | Proposed alignment significantly increases property impacts but does not significantly reduce impacts to natural areas or indirect impacts to residences.<br>Refinement will not be implemented. |
|--------------------|--|

|  |  |  |                      |
|--|--|--|----------------------|
|  <b>Ontario</b><br>Ministry of Transportation | <b>HIGHWAY 404 EXTENSION</b><br>Davis Drive to Highway 12<br>Route Planning Study and Environmental Assessment | <b>EVALUATION OF ROUTE REFINEMENTS</b> | <b>EXHIBIT 4.11A</b> |
|  |  |  |                      |


|  |  |                                  |  |
|--|--|----------------------------------|--|
| ROUTE: B1A   |  | From: Woodbine Avenue            | To: Carly Road   |
| DESCRIPTION OF EXISTING ALIGNMENT:   |  |                                  |  |
| <ul style="list-style-type: none"><li>• Parallels Ravenshoe Road one lot south along property /lot line</li><li>• East of hamlet of Ravenshoe, alignment parallels Kennedy Road along back of farms which front on Ravenscrest Road.</li><li>• East of Kennedy Road, alignment follows property /lot lines, aligning to parallel existing hydro corridor across Black River wetland.</li></ul> |  |                                  |  |
| DESCRIPTION OF REFINEMENT:   |  |                                  |  |
| <ul style="list-style-type: none"><li>• East of Woodbine Avenue, alignment roughly parallels edge of Maskinonge River Wetland, crossing Warden Avenue south of Georgina Landfill.</li><li>• East of Warden Avenue, alignment follows property /lot lines, aligning to parallel existing hydro corridor across Black River wetland.</li></ul>   |  |                                  |  |
| REASON FOR PROPOSING REFINEMENT:   |  |                                  |  |
| <ul style="list-style-type: none"><li>• Reduces overall impacts to agricultural operations by avoiding horse farm and beef operation in vicinity of Catering Road and Warden Avenue.</li></ul>   |  |                                  |  |
| DESIGN OBJECTIVE   |  | ASSESSMENT                       |  |
| ENGINEERING  |  | COMMENTS                         |  |
| Horizontal and vertical alignments to be consistent with a 120 km/h controlled access freeway.   |  | Significant Reduction in Impacts | Improved crossing angle at Kennedy Road allows for standard geometrics at proposed interchange.  |
| Generate horizontal and vertical alignments so as to produce an efficient design which considers crossing angles of roads, railways, rivers, etc, and directness of route.   |  | Significant Reduction in Impacts | Proposed alignment improves crossings of Ravenshoe Road and Kennedy Road.  |
| SOCIAL   |  |                                  |  |
| Minimize direct impacts to urban areas and clustered rural settlements.  |  | No Significant Change in Impacts | Both alternatives result in diagonal severances of property in vicinity of alignment curves.   |
| Minimize direct impacts to property by following lot/ concession/ field lines or existing right-of-ways.   |  | No Significant Change in Impacts |  |
| NATURAL ENVIRONMENT  |  |                                  |  |
| Minimize impacts to natural areas by either following edges of natural areas and /or crossing natural areas at narrowest location.   |  | No Significant Change in Impacts | Proposed alignment reduces encroachment on Black River Wetland unit at Kennedy Road, but encroaches on Maskinonge River Wetland. These wetland units are of equal significance, therefore no significant change in impacts.  |
| Minimize river and stream crossings.   |  | No Significant Change in Impacts |  |
| Minimize impacts to greenland systems.   |  | No Significant Change in Impacts |  |
| ECONOMIC ENVIRONMENT   |  |                                  |  |
| Follow lot/ concession/ field lines to avoid dividing viable fields with the highway right-of-way.   |  | Significant Reduction in Impacts | Existing alignment impacts four agricultural operations, one of which is impacted significantly. Proposed alignment impacts three operations, none of which are significantly impacted. Proposed alignment creates more diagonal severances, however, there is no significant increase in impact to productive farmland. |
| Minimize impacts to high value, intensive farms.   |  | No Significant Change in Impacts |  |
| CULTURAL ENVIRONMENT   |  |                                  |  |
| Minimize impact to registered and unregistered cemeteries which have been identified and documented.   |  | Significant Reduction in Impacts | Proposed alignment reduces disruption impacts to cemetery on Ravenshoe Road west of Kennedy Road.  |
| Minimize impacts to known heritage features of high and moderate significance.   |  | No Significant Change in Impacts |  |
| Minimize impacts to known archaeological features  |  | No Significant Change in Impacts |  |
| CONCLUSIONS  |  |                                  |  |
| Proposed alignment reduces impacts to engineering, economic and cultural factors with no significant change in impacts to natural areas. Refinement to be implemented.   |  |                                  |  |



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|---|--|--|
| <b>ROUTE: B2</b>                          | From: York Regional Road 18 (Egypt Sideroad) To: Stoney Batter Road  |  |
| <b>DESCRIPTION OF EXISTING ALIGNMENT:</b> | <ul style="list-style-type: none"> <li>East-west section follows mid-concession property lines between Egypt Sideroad and Zephyr-Egypt Wetland Complex.</li> <li>North-south section follows property /lot lines along western edge of Zephyr-Egypt Wetland Complex.</li> <li>Ties in to route alternative B at mid-concession south of Highway 48.</li> </ul> |  |
| <b>DESCRIPTION OF REFINEMENT:</b>         | <ul style="list-style-type: none"> <li>Alignment follows southern edge of Vachell Swamp wooded wetland, along back edges of agricultural operations.</li> <li>Ties in to B route alternative at mid-concession south of Highway 48.</li> </ul>   |  |
| <b>REASON FOR PROPOSING REFINEMENT:</b>   | <ul style="list-style-type: none"> <li>Reduces overall impacts to agricultural operations by reducing number of agricultural operations impacted.</li> </ul>   |  |

| DESIGN OBJECTIVE   | ASSESSMENT                       | COMMENTS  |
|--|----------------------------------|---|
| <b>ENGINEERING</b>   |                                  |   |
| Horizontal and vertical alignments to be consistent with a 120 km/h controlled access freeway.   | No Significant Change in Impacts |   |
| Generate horizontal and vertical alignments so as to produce an efficient design which considers crossing angles of roads, railways, rivers, etc, and directness of route. | Significant Reduction in Impacts | Proposed alignment is a more direct path approximately 1200 m shorter than the existing alignment.  |
| <b>SOCIAL</b>  |                                  |   |
| Minimize direct impacts to urban areas and clustered rural settlements.  | No Significant Change in Impacts |   |
| Minimize direct impacts to property by following lot/ concession/ field lines or existing right-of-ways.   | No Significant Change in Impacts | Existing alignment follows property lines; proposed alignment follows field lines.  |
| <b>NATURAL ENVIRONMENT</b>   |                                  |   |
| Minimize impacts to natural areas by either following edges of natural areas and /or crossing natural areas at narrowest location.   | Significant Increase in Impacts  | Existing alignment avoids Vachell Swamp.<br>Proposed alignment encroaches on (within 120 m) Vachell Swamp.  |
| Minimize river and stream crossings.   | No Significant Change in Impacts |   |
| Minimize impacts to greenland systems.   | No Significant Change in Impacts | Both alternatives impact wildlife corridors.  |
| <b>ECONOMIC ENVIRONMENT</b>  |                                  |   |
| Follow lot/ concession/ field lines to avoid dividing viable fields with the highway right-of-way.   | Significant Decrease in Impacts  | Existing alignment impacts fifteen farm operations, three of which are impacted significantly.<br>Proposed alignment impacts ten farms, one of which is impacted significantly. |
| Minimize impacts to high value, intensive farms.   | No Significant Change in Impacts | Both alternatives avoid high value intensive operations.  |
| <b>CULTURAL ENVIRONMENT</b>  |                                  |   |
| Minimize impact to registered and unregistered cemeteries which have been identified and documented.   | No Significant Change in Impacts |   |
| Minimize impacts to known heritage features of high and moderate significance.   | No Significant Change in Impacts |   |
| Minimize impacts to known archaeological features  | No Significant Change in Impacts |   |


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| <b>CONCLUSIONS</b> | Reduction of significant impacts to agricultural operations outweighs encroachment impacts to natural areas.<br>Refinement to be implemented. |
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|  <b>Ontario</b><br>Ministry of Transportation | <b>HIGHWAY 404 EXTENSION</b><br>Davis Drive to Highway 12<br>Route Planning Study and Environmental Assessment | <b>EVALUATION OF ROUTE REFINEMENTS</b> | <b>EXHIBIT 4.11C</b> |
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|---|--|-------------------------|
| <b>ROUTE: B3A</b>                         | <b>From: Kennedy Road</b>  | <b>To: McCowan Road</b> |
| <b>DESCRIPTION OF EXISTING ALIGNMENT:</b> | <ul style="list-style-type: none"> <li>Follows southern edge of Sod Swamp, and aligns with field lines on lots 16 &amp; 18 north of Old Homestead Road.</li> </ul>   |                         |
| <b>DESCRIPTION OF REFINEMENT:</b>         | <ul style="list-style-type: none"> <li>Follows southern edge of Sod Swamp, and aligns with property lines on lot 17 west of McCowan Road.</li> </ul>   |                         |
| <b>REASON FOR PROPOSING REFINEMENT:</b>   | <ul style="list-style-type: none"> <li>Reduces direct impacts to specialty crop (apple orchard) on north side of Sod Swamp.</li> <li>Generally reduces impacts to agricultural operations in this area.</li> </ul> |                         |

| DESIGN OBJECTIVE   | ASSESSMENT                       | COMMENTS   |
|--|----------------------------------|--|
| <b>ENGINEERING</b>   |                                  |  |
| Horizontal and vertical alignments to be consistent with a 120 km/h controlled access freeway.   | No Significant Change in Impacts |  |
| Generate horizontal and vertical alignments so as to produce an efficient design which considers crossing angles of roads, railways, rivers, etc, and directness of route. | No Significant Change in Impacts |  |
| <b>SOCIAL</b>  |                                  |  |
| Minimize direct impacts to urban areas and clustered rural settlements.  | No Significant Change in Impacts |  |
| Minimize direct impacts to property by following lot/concession/field lines or existing right-of-ways.   | No Significant Change in Impacts |  |
| <b>NATURAL ENVIRONMENT</b>   |                                  |  |
| Minimize impacts to natural areas by either following edges of natural areas and/or crossing natural areas at narrowest location.  | Significant Reduction in Impacts | Existing alignment severs Sod Swamp; proposed alignment encroaches on eastern edge of Sod Swamp.   |
| Minimize river and stream crossings.   | No Significant Change in Impacts |  |
| Minimize impacts to greenland systems.   | No Significant Change in Impacts |  |
| <b>ECONOMIC ENVIRONMENT</b>  |                                  |  |
| Follow lot/concession/field lines to avoid dividing viable fields with the highway right-of-way.   | Significant Reduction in Impacts | Existing alignment creates significant severance impacts to working fields of agricultural operations north of Old Homestead Road.<br>Proposed route follows woodlot interface more closely, reducing impacts to working fields. |
| Minimize impacts to high value, intensive farms.   | No Significant Change in Impacts |  |
| <b>CULTURAL ENVIRONMENT</b>  |                                  |  |
| Minimize impact to registered and unregistered cemeteries which have been identified and documented.   | No Significant Change in Impacts |  |
| Minimize impacts to known heritage features of high and moderate significance.   | No Significant Change in Impacts |  |
| Minimize impacts to known archaeological features  | No Significant Change in Impacts |  |

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| <b>CONCLUSIONS</b> | Proposed alignment results in significant reduction in impacts to area farm operations and Sod Swamp, including a specialty crop farm.<br>Refinement to be implemented. |
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|  <b>Ontario</b><br>Ministry of Transportation | <b>HIGHWAY 404 EXTENSION</b><br>Davis Drive to Highway 12<br>Route Planning Study and Environmental Assessment |                      |
|  | <b>EVALUATION OF ROUTE REFINEMENTS</b>   | <b>EXHIBIT 4.11D</b> |



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|---|---|
| <b>ROUTE: B3B</b>                         | From: Kennedy Road<br>To: McCowan Road  |
| <b>DESCRIPTION OF EXISTING ALIGNMENT:</b> | <ul style="list-style-type: none"> <li>Follows northern edge of Sod Swamp, and aligns with field lines on lots 16 &amp; 18 north of Old Homestead Road.</li> </ul>  |
| <b>DESCRIPTION OF REFINEMENT:</b>         | <ul style="list-style-type: none"> <li>Alignment crosses Sod Swamp and aligns with property lines on lot 17 west of McCowan Road.</li> </ul>  |
| <b>REASON FOR PROPOSING REFINEMENT:</b>   | <ul style="list-style-type: none"> <li>Avoids specialty crop (apple orchard) on north side of Sod Swamp.</li> <li>Generally reduces impacts to agricultural operations for farms in this area.</li> </ul> |

| DESIGN OBJECTIVE   | ASSESSMENT                       | COMMENTS   |
|--|----------------------------------|--|
| <b>ENGINEERING</b>   |                                  |  |
| Horizontal and vertical alignments to be consistent with a 120 km/h controlled access freeway.   | No Significant Change in Impacts |  |
| Generate horizontal and vertical alignments so as to produce an efficient design which considers crossing angles of roads, railways, rivers, etc, and directness of route. | No Significant Change in Impacts |  |
| <b>SOCIAL</b>  |                                  |  |
| Minimize direct impacts to urban areas and clustered rural settlements.  | No Significant Change in Impacts |  |
| Minimize direct impacts to property by following lot/concession/field lines or existing right-of-ways.   | No Significant Change in Impacts |  |
| <b>NATURAL ENVIRONMENT</b>   |                                  |  |
| Minimize impacts to natural areas by either following edges of natural areas and/or crossing natural areas at narrowest location.  | Significant Increase in Impacts  | Proposed alignment increases impacts to Sod Swamp, with associated impacts to hydrology, habitat and buffer zone.  |
| Minimize river and stream crossings.   | No Significant Change in Impacts |  |
| Minimize impacts to greenland systems.   | No Significant Change in Impacts |  |
| <b>ECONOMIC ENVIRONMENT</b>  |                                  |  |
| Follow lot/concession/field lines to avoid dividing viable fields with the highway right-of-way.   | Significant Reduction in Impacts | Existing alignment impacts specialty crop and creates significant severance impacts to working fields north of Old Homestead Road.<br>Proposed route avoids specialty crop and follows woodlot interface more closely, reducing impacts to working fields. |
| Minimize impacts to high value, intensive farms.   | No Significant Change in Impacts |  |
| <b>CULTURAL ENVIRONMENT</b>  |                                  |  |
| Minimize impact to registered and unregistered cemeteries which have been identified and documented.   | No Significant Change in Impacts |  |
| Minimize impacts to known heritage features of high and moderate significance.   | No Significant Change in Impacts |  |
| Minimize impacts to known archaeological features  | No Significant Change in Impacts |  |

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| <b>CONCLUSIONS</b> | Reduction of impacts to agricultural operations and specialty crop outweigh increased impacts to Sod Swamp. Refinement is to be implemented. |
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| <br><b>Ontario</b><br>Ministry of Transportation | <b>HIGHWAY 404 EXTENSION</b><br>Davis Drive to Highway 12<br>Route Planning Study and Environmental Assessment | <b>EVALUATION OF ROUTE REFINEMENTS</b> | <b>EXHIBIT 4.11E</b>  |
|   |  |  |  |



|                                    |   |                  |
|------------------------------------|---|------------------|
| ROUTE: B3                          | From: Catering Road   | To: York Road 18 |
| DESCRIPTION OF EXISTING ALIGNMENT: | <ul style="list-style-type: none"> <li>• Crosses Highway 48 approximately 600 metres south of High Street</li> </ul>  |                  |
| DESCRIPTION OF REFINEMENT:         | <ul style="list-style-type: none"> <li>• Alignment shifted southerly to cross Highway 48 approximately 800 metres south of High Street.</li> </ul>  |                  |
| REASON FOR PROPOSING REFINEMENT:   | <ul style="list-style-type: none"> <li>• Reduces direct impacts to residences on Highway 48 south of High Street.</li> <li>• Reduces impacts to high value agricultural operations for farm fronting Highway 48.</li> </ul> |                  |


| DESIGN OBJECTIVE<br>ENGINEERING  | ASSESSMENT                       | COMMENTS   |
|--|----------------------------------|--|
| Horizontal and vertical alignments to be consistent with a 120 km/h controlled access freeway.   | No Significant Change in Impacts |  |
| Generate horizontal and vertical alignments so as to produce an efficient design which considers crossing angles of roads, railways, rivers, etc. and directness of route. | No Significant Change in Impacts |  |
| <b>SOCIAL</b>  |                                  |  |
| Minimize direct impacts to urban areas and clustered rural settlements.  | Significant Reduction in Impacts | Proposed alignment reduces direct impacts to residential cluster along Highway 48 south of High Street.  |
| Minimize direct impacts to property by following lot/ concession/ field lines or existing right-of-ways.   | No Significant Change in Impacts |  |
| <b>NATURAL ENVIRONMENT</b>   |                                  |  |
| Minimize impacts to natural areas by either following edges of natural areas and /or crossing natural areas at narrowest location.   | No Significant Change in Impacts | Both alternatives impact a woodlot.  |
| Minimize river and stream crossings.   | No Significant Change in Impacts |  |
| Minimize impacts to greenland systems.   | No Significant Change in Impacts |  |
| <b>ECONOMIC ENVIRONMENT</b>  |                                  |  |
| Follow lot/ concession/ field lines to avoid dividing viable fields with the highway right-of-way.   | No Significant Change in Impacts |  |
| Minimize impacts to high value, intensive farms.   | Significant Reduction in Impacts | Existing alignment impacts high value beef operation east of Highway 48. Proposed alignment passes further south of the operation buildings, significantly reducing impacts to high value operation. |
| <b>CULTURAL ENVIRONMENT</b>  |                                  |  |
| Minimize impact to registered and unregistered cemeteries which have been identified and documented.   | No Significant Change in Impacts |  |
| Minimize impacts to known heritage features of high and moderate significance.   | No Significant Change in Impacts |  |
| Minimize impacts to known archaeological features  | No Significant Change in Impacts |  |

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| <b>CONCLUSIONS</b> | Proposed alignment results in significant reduction in impacts to residences and a high value farm along Highway 48, without increasing impacts to other factors.<br>Refinement is to be implemented. |
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| <b>ROUTE: B</b>                           | From: Stoney Batter Road<br>To: Weir's Sideroad  |
| <b>DESCRIPTION OF EXISTING ALIGNMENT:</b> | <ul style="list-style-type: none"> <li>• Crosses between Highway 48 and 6th Concession Road at mid-concession.</li> </ul>  |
| <b>DESCRIPTION OF REFINEMENT:</b>         | <ul style="list-style-type: none"> <li>• Alignment shifted southerly approximately 200 metres.</li> </ul>  |
| <b>REASON FOR PROPOSING REFINEMENT:</b>   | <ul style="list-style-type: none"> <li>• Reduces impacts to agricultural operations between Stoney Batter Road and Weir's Sideroad, including some specialty crop operations.</li> <li>• Reduces impacts to two natural environmental features.</li> </ul> |

| DESIGN OBJECTIVE<br>ENGINEERING  | ASSESSMENT                       | COMMENTS  |
|--|----------------------------------|---|
| Horizontal and vertical alignments to be consistent with a 120 km/h controlled access freeway.   | No Significant Change in Impacts |   |
| Generate horizontal and vertical alignments so as to produce an efficient design which considers crossing angles of roads, railways, rivers, etc, and directness of route. | No Significant Change in Impacts |   |
| <b>SOCIAL</b>  |                                  |   |
| Minimize direct impacts to urban areas and clustered rural settlements.  | No Significant Change in Impacts |   |
| Minimize direct impacts to property by following lot/concession/field lines or existing right-of-ways.   | No Significant Change in Impacts | Proposed alignment does not significantly increase property impacts to agricultural operations.   |
| <b>NATURAL ENVIRONMENT</b>   |                                  |   |
| Minimize impacts to natural areas by either following edges of natural areas and/or crossing natural areas at narrowest location.  | Significant Reduction in Impacts | Existing alignment directly impacts isolated wooded wetland in lot 15 and southern edge of wetland (complexed with Morning Glory Swamp) in lot 19.<br>Proposed alignment avoids wetland in lot 15 and encroaches on southern edge of wetland in lot 19. |
| Minimize river and stream crossings.   | No Significant Change in Impacts |   |
| Minimize impacts to greenland systems.   | No Significant Change in Impacts | Alignments have similar linkage impacts.  |
| <b>ECONOMIC ENVIRONMENT</b>  |                                  |   |
| Follow lot/concession/field lines to avoid dividing viable fields with the highway right-of-way.   | No Significant Change in Impacts | Both alignments follow field lines, where possible.   |
| Minimize impacts to high value, intensive farms.   | No Significant Change in Impacts | Both alignments avoid high value, intensive operations.   |
| <b>CULTURAL ENVIRONMENT</b>  |                                  |   |
| Minimize impact to registered and unregistered cemeteries which have been identified and documented.   | No Significant Change in Impacts |   |
| Minimize impacts to known heritage features of high and moderate significance.   | No Significant Change in Impacts |   |
| Minimize impacts to known archaeological features  | No Significant Change in Impacts |   |

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| <b>CONCLUSIONS</b> | Proposed alignment results in significant reduction in impacts to natural areas without increasing impacts to other factors.<br>Refinement is to be implemented. |
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|--|--|--|----------------------|
|  <b>Ontario</b><br>Ministry of Transportation | <b>HIGHWAY 404 EXTENSION</b><br>Davis Drive to Highway 12<br>Route Planning Study and Environmental Assessment | <b>EVALUATION OF ROUTE REFINEMENTS</b> | <b>EXHIBIT 4.11G</b> |
|  |  |  |                      |



ROUTE: B (North Crossing)

From: Weir's Sideroad

To: Durham Road 23

**DESCRIPTION OF EXISTING ALIGNMENT:**

- Crosses Pefferlaw Road at Cedardale Nazarene Camp, crosses Pefferlaw Brook at south end of Riverbank Drive.

**DESCRIPTION OF REFINEMENT:**

- From Weir's Sideroad, alignment turns north and runs along existing Highway 48 right-of-way.
- Highway 48 relocated north of existing right-of-way between Pefferlaw Road and Riverbank Drive; service road constructed along south side to maintain access for Green Acres Trailer Park.

**REASON FOR PROPOSING REFINEMENT:**

- Confines direct impacts to existing highway 'corridor', avoiding developed residential areas of Pefferlaw.

| DESIGN OBJECTIVE<br>ENGINEERING  | ASSESSMENT                       | COMMENTS   |
|--|----------------------------------|--|
| Horizontal and vertical alignments to be consistent with a 120 km/h controlled access freeway.   | No Significant Change in Impacts |  |
| Generate horizontal and vertical alignments so as to produce an efficient design which considers crossing angles of roads, railways, rivers, etc, and directness of route. | No Significant Change in Impacts | Proposed alignment requires additional road crossing and service roads. This additional work does result in significant changes to design efficiency.  |
| <b>SOCIAL</b>  |                                  |  |
| Minimize direct impacts to urban areas and clustered rural settlements.  | Significant Reduction in Impacts | Existing alignment crosses between residential developments through Cedardale Camp; impacts residences at south end of Riverbank Drive.<br>Proposed alignment reduces overall community impact, given that it closely parallels an existing major roadway through Pefferlaw; development along Highway 48 is significantly impacted. |
| Minimize direct impacts to property by following lot/concession/field lines or existing right-of-ways.   | No Significant Change in Impacts | Existing alignment follows property/field lines to reduce impacts to properties along Pefferlaw Road; directly impacts properties on Riverbank Drive.<br>Proposed alignment increases severance impacts to properties west of Pefferlaw Road; impacts properties along Highway 48 from west of Pefferlaw Road to Riverbank Drive.    |
| <b>NATURAL ENVIRONMENT</b>   |                                  |  |
| Minimize impacts to natural areas by either following edges of natural areas and/or crossing natural areas at narrowest location.  | Significant Reduction in Impacts | Existing alignment impacts non-provincially significant riparian wetland on west bank and forested area on east bank of Pefferlaw Brook.<br>Proposed alignment avoids non-provincially significant riparian wetland on west bank and forested area on east bank of Pefferlaw Brook.  |
| Minimize river and stream crossings.   | No Significant Change in Impacts |  |
| Minimize impacts to greenland systems.   | No Significant Change in Impacts |  |
| <b>ECONOMIC ENVIRONMENT</b>  |                                  |  |
| Follow lot/concession/field lines to avoid dividing viable fields with the highway right-of-way.   | Significant Increase in Impacts  | Existing alignment follows field/woodlot interface for agricultural operations west of Pefferlaw Road<br>Proposed alignment diagonally severs agricultural operations west of Pefferlaw Road, primarily hay fields.  |
| Minimize impacts to high value, intensive farms.   | No Significant Change in Impacts |  |
| <b>CULTURAL ENVIRONMENT</b>  |                                  |  |
| Minimize impact to registered and unregistered cemeteries which have been identified and documented.   | No Significant Change in Impacts |  |
| Minimize impacts to known heritage features of high and moderate significance.   | No Significant Change in Impacts |  |
| Minimize impacts to known archaeological features  | No Significant Change in Impacts |  |

**CONCLUSIONS**



The reduction of community impacts to Pefferlaw and natural areas outweighs the increase in impacts to the individual farming operations. Refinement is to be implemented.



|   |  |                           |
|---|--|---------------------------|
| <b>ROUTE: B (South Crossing)</b>          | <b>From: Weir's Sideroad</b>   | <b>To: Durham Road 23</b> |
| <b>DESCRIPTION OF EXISTING ALIGNMENT:</b> | <ul style="list-style-type: none"> <li>• Crosses Pefferlaw Road at Cedardale Camp, crosses Pefferlaw Brook at south end of Riverbank Drive.</li> </ul>   |                           |
| <b>DESCRIPTION OF REFINEMENT:</b>         | <ul style="list-style-type: none"> <li>• Crosses Pefferlaw Road south of Cedardale Camp, crosses Pefferlaw Brook south of Riverbank Drive.</li> <li>• Cross Durham Road 23 north of 13th Concession Road to avoid commercial/ industrial uses on east side of Durham Road 23.</li> </ul> |                           |
| <b>REASON FOR PROPOSING REFINEMENT:</b>   | <ul style="list-style-type: none"> <li>• Reduces impacts to Cedardale Camp, to residences immediately north of Cedardale Camp, and to residences at south end of Riverbank Drive.</li> </ul>   |                           |


| DESIGN OBJECTIVE   | ASSESSMENT                       | COMMENTS   |
|--|----------------------------------|--|
| <b>ENGINEERING</b>   |                                  |  |
| Horizontal and vertical alignments to be consistent with a 120 km/h controlled access freeway.   | No Significant Change in Impacts |  |
| Generate horizontal and vertical alignments so as to produce an efficient design which considers crossing angles of roads, railways, rivers, etc, and directness of route. | Significant Reduction in Impacts | Proposed alignment improves crossings of CN rail line and hydro corridor east of Pefferlaw.  |
| <b>SOCIAL</b>  |                                  |  |
| Minimize direct impacts to urban areas and clustered rural settlements.  | Significant Reduction in Impacts | Existing alignment impacts two residential neighbourhoods, a church and Cedardale Camp. Proposed alignment impacts one neighbourhood, avoids church and Cedardale Camp.  |
| Minimize direct impacts to property by following lot /concession/ field lines or existing right-of-ways.   | Significant Reduction in Impacts | Existing alignment generates significant property impacts to one residential neighbourhood, a church and Cedardale Camp.<br>Proposed alignment generates significant impacts to one residential neighbourhood.   |
| <b>NATURAL ENVIRONMENT</b>   |                                  |  |
| Minimize impacts to natural areas by either following edges of natural areas and /or crossing natural areas at narrowest location.   | Significant Increase in Impacts  | Existing alignment impacts non-provincially significant wetland on west side of Pefferlaw Brook and forested area east of Riverbank Drive.<br>Proposed alignment avoids non-provincially significant wetland but significantly increases impacts to forested areas on both sides of brook. |
| Minimize river and stream crossings.   | No Significant Change in Impacts |  |
| Minimize impacts to greenland systems.   | Significant Increase in Impacts  | Existing alignment crosses brook where east bank has been altered from natural state.<br>Proposed alignment crosses brook where banks are unarmoured and sheltered - good wildlife habitat.  |
| <b>ECONOMIC ENVIRONMENT</b>  |                                  |  |
| Follow lot /concession/ field lines to avoid dividing viable fields with the highway right-of-way.   | No Significant Change in Impacts | Both alternatives follow property /field lines to avoid dividing viable fields.  |
| Minimize impacts to high value, intensive farms.   | No Significant Change in Impacts |  |
| <b>CULTURAL ENVIRONMENT</b>  |                                  |  |
| Minimize impact to registered and unregistered cemeteries which have been identified and documented.   | No Significant Change in Impacts |  |
| Minimize impacts to known heritage features of high and moderate significance.   | No Significant Change in Impacts |  |
| Minimize impacts to known archaeological features  | No Significant Change in Impacts | Proposed alignment avoids, but passes in closer proximity to, known archaeological site of limited significance.   |

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| <b>CONCLUSIONS</b> | In vicinity of Pefferlaw, minimizing social impacts is a prime consideration for reducing impacts. Reducing social impacts results in increased natural environment impacts. Overall, impacts are reduced with refined alternative.<br>Refinement is to be implemented. |
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|  <b>Ontario</b><br>Ministry of Transportation | <b>HIGHWAY 404 EXTENSION</b><br><b>Davis Drive to Highway 12</b><br>Route Planning Study and Environmental Assessment | <b>EVALUATION OF ROUTE REFINEMENTS</b> | <b>EXHIBIT 4.11i</b> |
|  |  <b>COLE SHERMAN</b>             |  |                      |

| ROUTE: C1  | From: Pefferlaw Brook<br>To: Durham Regional Road 1   |  |
|--|---|--|
| DESCRIPTION OF EXISTING ALIGNMENT:   | <ul style="list-style-type: none"> <li>Follows property line in Concession 6, then follows western edge of Lower Uxbridge Book Wetland in Concession 7.</li> </ul>  |  |
| DESCRIPTION OF REFINEMENT:   | <ul style="list-style-type: none"> <li>Follow eastern edge of Pefferlaw-Udora Wetland Complex and connect to alternative C2 at Durham Road 1.</li> </ul>  |  |
| REASON FOR PROPOSING REFINEMENT:   | <ul style="list-style-type: none"> <li>Avoids Lower Uxbridge Brook Wetland ESA, reducing natural environment impacts</li> <li>Avoids 'High Value' agricultural buildings in vicinity of Durham Road 1 crossing, reducing effect on agricultural operations in the area.</li> <li>Enables a connection to refined alignment D2.</li> </ul> |  |
| DESIGN OBJECTIVE   | ASSESSMENT  | COMMENTS   |
| <b>ENGINEERING</b>   |   |  |
| Horizontal and vertical alignments to be consistent with a 120 km/h controlled access freeway.   | No Significant Change in Impacts  |  |
| Generate horizontal and vertical alignments so as to produce an efficient design which considers crossing angles of roads, railways, rivers, etc, and directness of route. | No Significant Change in Impacts  | Proposed alignment requires one additional road crossing. This crossing does not significantly impact design efficiency.   |
| <b>SOCIAL</b>  |   |  |
| Minimize direct impacts to urban areas and clustered rural settlements.  | No Significant Change in Impacts  |  |
| Minimize direct impacts to property by following lot/concession/field lines or existing right-of-ways.   | No Significant Change in Impacts  |  |
| <b>NATURAL ENVIRONMENT</b>   |   |  |
| Minimize impacts to natural areas by either following edges of natural areas and/or crossing natural areas at narrowest location.  | Significant Reduction in Impacts  | Proposed alignment significantly reduces river/stream crossing impacts of Uxbridge Brook, and associated upland forest, which provide amphibian habitat, but crosses an extension of Pefferlaw Udora Wetland; overall, a net reduction of impacts. |
| Minimize river and stream crossings.   | No Significant Change in Impacts  | Existing and proposed alignments have same number of river/stream crossings  |
| Minimize impacts to greenland systems.   | No Significant Change in Impacts  | Existing alignment severs Lower Uxbridge Brook Wetland<br>Proposed alignment severs a corridor extending from Pefferlaw Udora Wetland Complex.   |
| <b>ECONOMIC ENVIRONMENT</b>  |   |  |
| Follow lot/concession/field lines to avoid dividing viable fields with the highway right-of-way.   | Significant Reduction in Impacts  | By following woodlot interface rather than property lines, proposed alignment reduces impacts to agricultural operations.  |
| Minimize impacts to high value, intensive farms.   | Significant Reduction in Impacts  | Proposed alignment avoids several high value agricultural operations   |
| <b>CULTURAL ENVIRONMENT</b>  |   |  |
| Minimize impact to registered and unregistered cemeteries which have been identified and documented.   | No Significant Change in Impacts  |  |
| Minimize impacts to known heritage features of high and moderate significance.   | No Significant Change in Impacts  |  |
| Minimize impacts to known archaeological features  | No Significant Change in Impacts  |  |

|             |   |
|-------------|---|
| CONCLUSIONS | Proposed alignment reduces overall impacts.<br>Refinement is to be implemented. |
|-------------|---|


|   |  |                      |
|---|--|----------------------|
| <br><b>Ontario</b><br>Ministry of Transportation | <b>HIGHWAY 404 EXTENSION</b><br>Davis Drive to Highway 12<br>Route Planning Study and Environmental Assessment |                      |
|   | <b>EVALUATION OF ROUTE REFINEMENTS</b>   | <b>EXHIBIT 4.11j</b> |




|   |  |                                    |
|---|--|------------------------------------|
| <b>ROUTE:</b> C2                          | <b>From:</b> Durham Road 39  | <b>To:</b> Uxbridge 5th Concession |
| <b>DESCRIPTION OF EXISTING ALIGNMENT:</b> | <ul style="list-style-type: none"> <li>Follows mid-concession in Concession 4.</li> </ul>  |                                    |
| <b>DESCRIPTION OF REFINEMENT:</b>         | <ul style="list-style-type: none"> <li>Shift alignment westward to follow wetland / agricultural boundary on east edge of Zephyr-Egypt Wetland Complex.</li> </ul>             |                                    |
| <b>REASON FOR PROPOSING REFINEMENT:</b>   | <ul style="list-style-type: none"> <li>Aligning with wetland / agricultural boundary may reduce impacts to agricultural operations, since fewer farms are impacted.</li> </ul> |                                    |

| DESIGN OBJECTIVE   | ASSESSMENT                       | COMMENTS   |
|--|----------------------------------|--|
| <b>ENGINEERING</b>   |                                  |  |
| Horizontal and vertical alignments to be consistent with a 120 km/h controlled access freeway.   | No Significant Change in Impacts |  |
| Generate horizontal and vertical alignments so as to produce an efficient design which considers crossing angles of roads, railways, rivers, etc, and directness of route. | No Significant Change in Impacts |  |
| <b>SOCIAL</b>  |                                  |  |
| Minimize direct impacts to urban areas and clustered rural settlements.  | No Significant Change in Impacts |  |
| Minimize direct impacts to property by following lot / concession / field lines or existing right-of-ways.   | Significant Increase in Impacts  | Existing alignment follows property / lot lines, resulting in significant property impacts to 6 properties.<br>Proposed alignment follows edge of woodlot / wetland, resulting in significant property impacts to 11 properties.   |
| <b>NATURAL ENVIRONMENT</b>   |                                  |  |
| Minimize impacts to natural areas by either following edges of natural areas and / or crossing natural areas at narrowest location.  | Significant Increase in Impacts  | Existing alignment avoids Zephyr-Egypt Wetland Complex, a provincially significant wetland. Substantial length of refined alignment directly impacts and encroaches on (within 120 m) wetland complex.   |
| Minimize river and stream crossings.   | No Significant Change in Impacts |  |
| Minimize impacts to greenland systems.   | Significant Increase in Impacts  | Existing alignment situated on disturbed land (cleared for agriculture) of limited significance and function as a greenland system.<br>Refined alignment impacts provincially significant wetland and upland forest which have higher significance and function as a greenland system. |
| <b>ECONOMIC ENVIRONMENT</b>  |                                  |  |
| Follow lot / concession / field lines to avoid dividing viable fields with the highway right-of-way.   | Significant Reduction in Impacts | Existing alignment impacts 22 agricultural operations, 5 of which are significantly impacted.<br>Proposed alignment impacts 13 agricultural operations, 2 of which are significantly impacted.   |
| Minimize impacts to high value, intensive farms.   | No Significant Change in Impacts |  |
| <b>CULTURAL ENVIRONMENT</b>  |                                  |  |
| Minimize impact to registered and unregistered cemeteries which have been identified and documented.   | No Significant Change in Impacts |  |
| Minimize impacts to known heritage features of high and moderate significance.   | No Significant Change in Impacts |  |
| Minimize impacts to known archaeological features  | No Significant Change in Impacts |  |

|                    |   |
|--------------------|---|
| <b>CONCLUSIONS</b> | Increased natural environment and property impacts outweigh reduced impacts to agricultural operations.<br>Overall, refined alignment does result in reduction of impacts.<br>Refinement will not be implemented. |
|--------------------|---|


**Ontario**  
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**COLE SHERMAN**

# HIGHWAY 404 EXTENSION

## Davis Drive to Highway 12

### Route Planning Study and Environmental Assessment

## EVALUATION OF ROUTE REFINEMENTS


EXHIBIT  
4.11K



|                                    |   |
|------------------------------------|---|
| ROUTE: D2                          | From: Durham Regional Road 1<br>To: Durham Regional Road 23   |
| DESCRIPTION OF EXISTING ALIGNMENT: | <ul style="list-style-type: none"> <li>Parallels Durham Road 23 one lot east of Durham Road 23.</li> </ul>  |
| DESCRIPTION OF REFINEMENT:         | <ul style="list-style-type: none"> <li>From Durham Road 1, alignment turns north along edge of wetland, crossing Ravenshoe Road east of Udora. North of Ravenshoe Road, alignment located along edge of Lower Pefferlaw Brook Wetland, crossing Durham Road 23 north of 3rd Concession Road (Rosslyn Drive).</li> </ul> |
| REASON FOR PROPOSING REFINEMENT:   | <ul style="list-style-type: none"> <li>Reduces overall impacts to agricultural operations by following edge of agricultural area west of Durham Road 23.</li> <li>Avoids Kydd Road crossing, reducing impacts to residential cluster.</li> </ul>  |

| DESIGN OBJECTIVE   | ASSESSMENT                       | COMMENTS   |
|--|----------------------------------|--|
| <b>ENGINEERING</b>   |                                  |  |
| Horizontal and vertical alignments to be consistent with a 120 km/h controlled access freeway.   | No Significant Change in Impacts |  |
| Generate horizontal and vertical alignments so as to produce an efficient design which considers crossing angles of roads, railways, rivers, etc, and directness of route. | No Significant Change in Impacts | Existing alignment crosses Kydd Road and Durham Road 23.<br>Proposed alignment crosses York Road 32, York Road 82 and Durham Road 23. Additional road crossing will not significantly impact design efficiency.  |
| <b>SOCIAL</b>  |                                  |  |
| Minimize direct impacts to urban areas and clustered rural settlements.  | Significant Reduction in Impacts | Existing alignment directly impacts residential cluster on Kydd Lane.<br>Proposed alignment does not directly impact residential clusters.   |
| Minimize direct impacts to property by following lot/concession/field lines or existing right-of-ways.   | No Significant Change in Impacts |  |
| <b>NATURAL ENVIRONMENT</b>   |                                  |  |
| Minimize impacts to natural areas by either following edges of natural areas and/or crossing natural areas at narrowest location.  | Significant Reduction in Impacts | Proposed alignment significantly reduces impacts to Lower Uxbridge Brook Wetland (provincially significant), and avoids Valentyne Wetland, but encroaches on Lower Pefferlaw Brook Wetland (provincially significant). Overall, a net reduction of impacts to natural areas. |
| Minimize river and stream crossings.   | Significant Reduction in Impacts | Proposed alignment reduces crossing impacts to Uxbridge Brook and crosses fewer streams than the existing alignment.   |
| Minimize impacts to greenland systems.   | No Significant Change in Impacts | Existing and proposed alignments sever the same greenland linkages.  |
| <b>ECONOMIC ENVIRONMENT</b>  |                                  |  |
| Follow lot/concession/field lines to avoid dividing viable fields with the highway right-of-way.   | Significant Reduction in Impacts | Existing alignment follows lot lines between agricultural operations.<br>By following woodlot interface, impacts to farm buildings and working fields are reduced with proposed alignment.   |
| Minimize impacts to high value, intensive farms.   | No Significant Change in Impacts | Existing alignment avoids high value operations west of Durham Road 23.<br>Proposed alignment passes in close proximity, but does not significantly affect high value operations west of Durham Road 23.   |
| <b>CULTURAL ENVIRONMENT</b>  |                                  |  |
| Minimize impact to registered and unregistered cemeteries which have been identified and documented.   | No Significant Change in Impacts |  |
| Minimize impacts to known heritage features of high and moderate significance.   | No Significant Change in Impacts |  |
| Minimize impacts to known archaeological features  | Significant Increase in Impacts  | Existing alignment avoids known archaeological site.<br>Proposed alignment encroaches (within 500 m) on a known archaeological site.   |

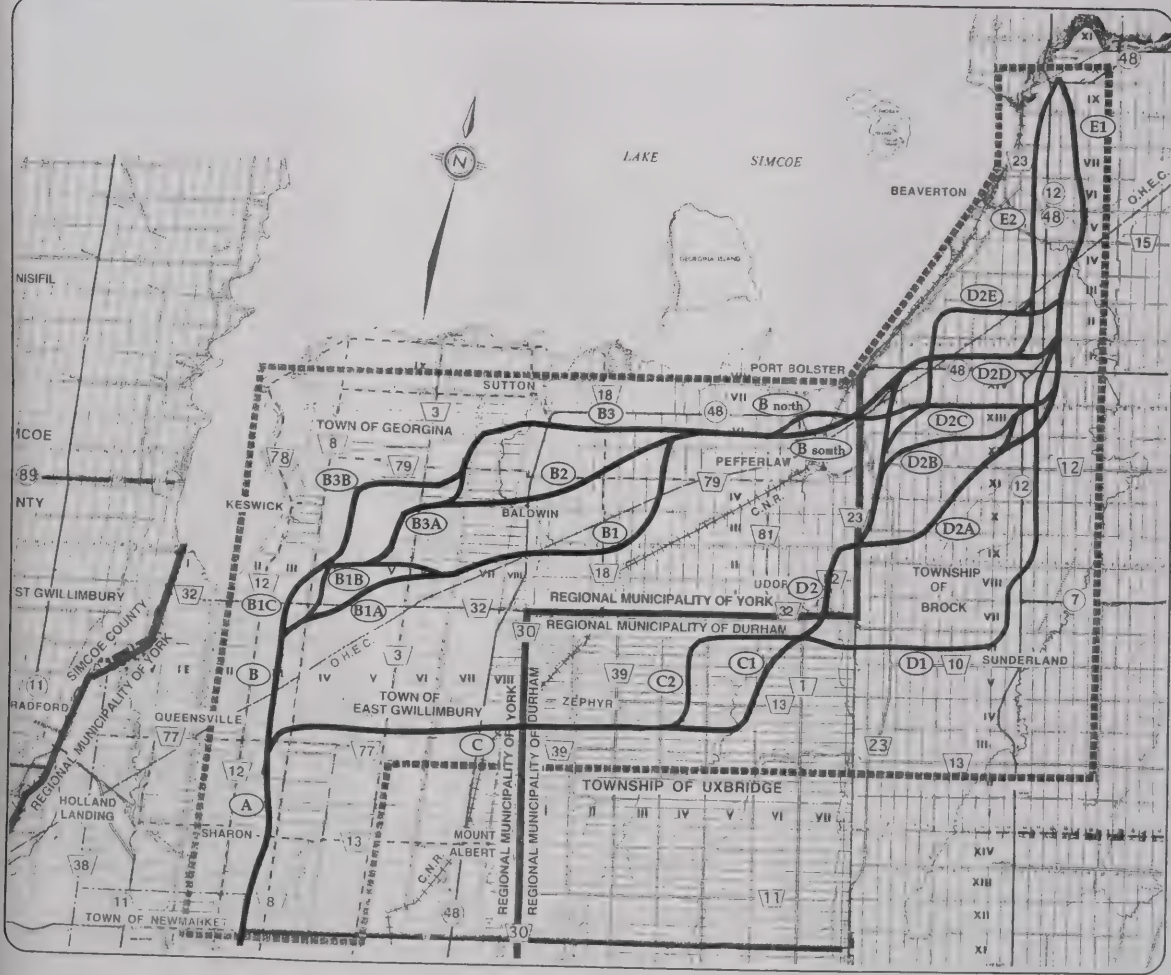
|                    |   |
|--------------------|---|
| <b>CONCLUSIONS</b> | Reduction in agricultural, wetland and social impacts outweighs increase in impacts to archaeological site.<br>Refinement is to be implemented. |
|--------------------|---|

|   |  |  |                      |
|---|--|--|----------------------|
| <br><b>Ontario</b><br>Ministry of Transportation | <b>HIGHWAY 404 EXTENSION</b><br>Davis Drive to Highway 12<br>Route Planning Study and Environmental Assessment | <b>EVALUATION OF ROUTE REFINEMENTS</b> | <b>EXHIBIT 4.11L</b> |
|---|--|--|----------------------|

|  |  |  |
|--|--|--|
| <b>ROUTE: E1</b>   | From: Brock Township 4th Line To: Brock Township 7th Line  |  |
| <b>DESCRIPTION OF EXISTING ALIGNMENT:</b>  | <ul style="list-style-type: none"> <li>At 4th Line, alignment swings eastward to reduce impacts to existing development along Durham Regional Road 15.</li> <li>North of Regional Road 15, alignment generally follows property/lot line between lots 8 and 9.</li> <li>Alignment crosses Durham Road 15 an additional half-lot east of existing alignment.</li> <li>Reduces overall impacts associated with route alternative by reducing impact to development along Regional Road 15 and to agricultural operations on Road 15 and 6th Line.</li> </ul> |  |
| <b>DESCRIPTION OF REFINEMENT:</b>  |  |  |
| <b>REASON FOR PROPOSING REFINEMENT:</b>  |  |  |
| <b>DESIGN OBJECTIVE</b>  | <b>ASSESSMENT</b>  | <b>COMMENTS</b>  |
| <b>ENGINEERING</b>   |  |  |
| Horizontal and vertical alignments to be consistent with a 120 km/h controlled access freeway.   | No Significant Change in Impacts   |  |
| Generate horizontal and vertical alignments so as to produce an efficient design which considers crossing angles of roads, railways, rivers, etc, and directness of route. | No Significant Change in Impacts   |  |
| <b>SOCIAL</b>  |  |  |
| Minimize direct impacts to urban areas and clustered rural settlements.  | Significant Reduction in Impacts   | Existing alignment impacts residences along Durham Road 15.  |
| Minimize direct impacts to property by following lot/concession/field lines or existing right-of-ways.   | No Significant Change in Impacts   | Proposed alignment located further east, reducing impacts to residential cluster on Road 15.   |
| <b>NATURAL ENVIRONMENT</b>   |  |  |
| Minimize impacts to natural areas by either following edges of natural areas and/or crossing natural areas at narrowest location.  | Significant Increase in Impacts  | Proposed route avoids one woodlot, but encroaches on a non-provincially significant wetland and large woodlot, resulting in a net increase in impacts. |
| Minimize river and stream crossings.   | No Significant Change in Impacts   | Proposed alignment results in one additional creek crossing.   |
| Minimize impacts to greenland systems.   | No Significant Change in Impacts   |  |
| <b>ECONOMIC ENVIRONMENT</b>  |  |  |
| Follow lot/concession/field lines to avoid dividing viable fields with the highway right-of-way.   | No Significant Change in Impacts   |  |
| Minimize impacts to high value, intensive farms.   | No Significant Change in Impacts   |  |
| <b>CULTURAL ENVIRONMENT</b>  |  |  |
| Minimize impact to registered and unregistered cemeteries which have been identified and documented.   | No Significant Change in Impacts   |  |
| Minimize impacts to known heritage features of high and moderate significance.   | No Significant Change in Impacts   |  |
| Minimize impacts to known archaeological features  | No Significant Change in Impacts   |  |
| <b>CONCLUSIONS</b>   | Reduction in impacts to residential cluster outweigh increase in impacts to natural areas. Refinement is to be implemented.  |  |



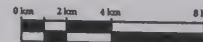




## FINAL ROUTE ALTERNATIVES

### LEGEND

STUDY AREA LIMIT



## HIGHWAY 404 EXTENSION

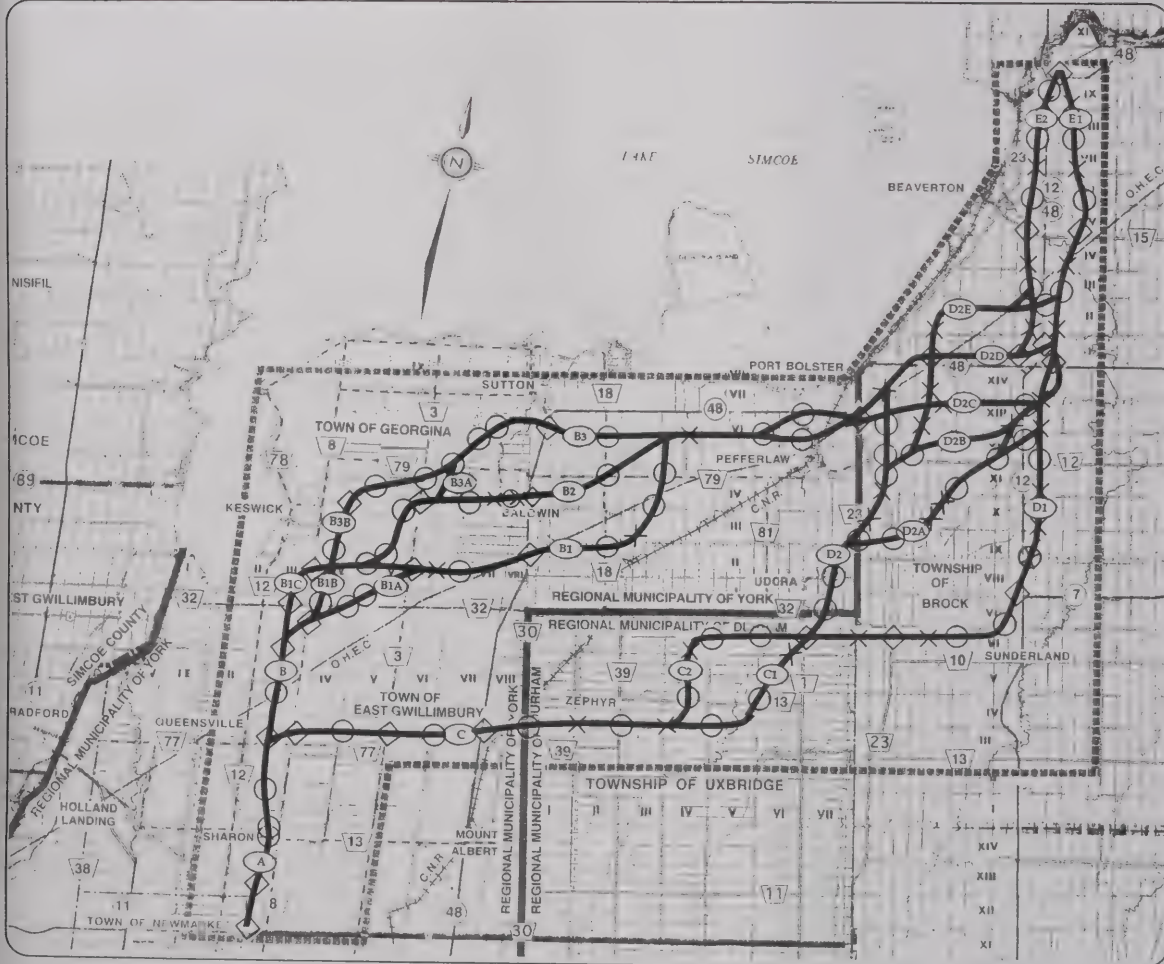
Davis Drive to Highway 12  
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EXHIBIT

4.12





# ASSUMED INTERCHANGE, GRADE SEPARATION AND ROAD CLOSING LOCATIONS

## LEGEND

ROUTE ALTERNATIVE



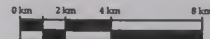
INTERCHANGE



GRADE SEPARATION



ROAD CLOSING



## HIGHWAY 404 EXTENSION

Davis Drive to Highway 12

Route Planning Study and  
Environmental Assessment





The Project Team noted that the proposed route refinement was not consistent with the route design objectives identified in Exhibit 4.8. However the design objectives could be modified to reflect York Region's concerns if a defensible rationale for such modifications was provided. For the purposes of analysis and evaluation, the route alignment was not refined.

#### **4.4 ANALYSIS OF ROUTE ALTERNATIVES**

Once the route refinements and interchange locations were finalized, the next step in the study process was analysis and evaluation. Due to the intensity of uses in the area, route alternatives which do not create environmental impacts are not possible. The objective of the route evaluation process was to identify the route alternative which generated the best combination of advantages and disadvantages.

The route alternatives were comprised of over 35 individual route segments. Some segments were unique to a route alternative while others were common to two or more alternatives. Initially, the analysis and evaluation of these route segments directly compared unique route segments, where applicable. Next, the preferred route segments were combined with common route segments for further comparison. The process culminated in the direct comparison of the best north route alternative and the best south route alternative, as illustrated in Exhibit 4.14.

##### **4.4.1 Evaluation Factors**

The Environmental Assessment Act requires a proponent to describe the effects that will be caused or that might reasonably be expected to be caused on the environment.

The broad definition of environment forms the basis for the criteria considered in this study. Evaluation criteria were organized into five factors: Transportation, Natural Environment, Social Environment, Economic Environment and Cultural Environment. The criteria represented the components of the environment that are directly, indirectly, or potentially affected by the undertaking. Impacts associated with each route alternative were quantified according to indicators and measures. The factors, criteria and indicators, as well as the specific measures used to assess impacts for each indicator used in the analysis and evaluation, are listed in Exhibit 4.15.

**Note to Reviewers:** The factors, criteria and indicators, as well as the specific measures used to assess impacts for each indicator used in the analysis and evaluation represent the most appropriate set of measurements to identify and assess the impacts associated with this project.

##### **4.4.2 Analysis**

As discussed previously, each route alternative was comprised of one or more route segments. As required, the impacts associated with route segments were combined between common decision points to provide the measurement of impacts for each route alternative. The common decision points established for defining the limits of each route alternative are illustrated on Exhibit 4.16.

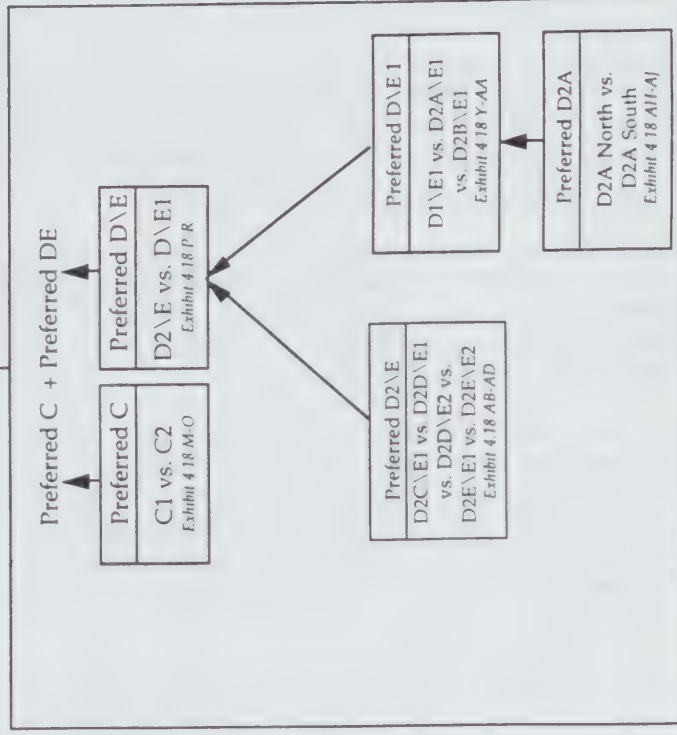
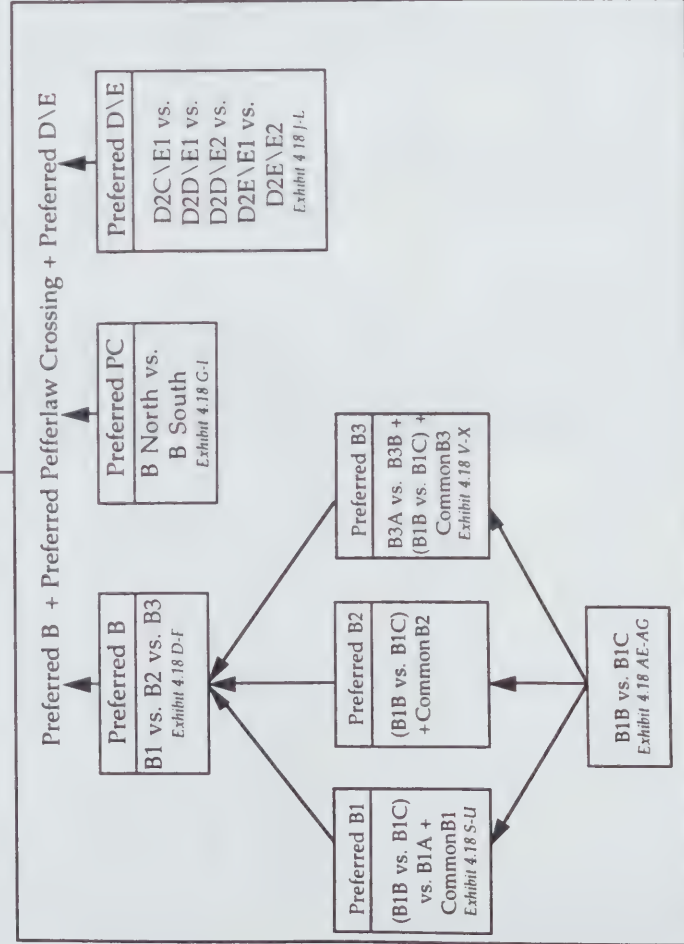
# SUMMARY EVALUATION CHART

Preferred Route

Preferred North Route

VS.  
Exhibit 4.18 A-C

Preferred South Route





| FACTOR            | CRITERIA   | INDICATOR  |
|-------------------|--|--|
| 1. Transportation | 1.1 Traffic Operations <ul style="list-style-type: none"> <li>Examines how well each alternative will allow traffic to move through the study area.</li> </ul>   | a) Length of Highway subject to potential for slow moving vehicles<br>b) Design hour volume (forecast)<br>c) Climate conditions<br>d) Energy usage with alternative  |
|                   | 1.2 Network Compatibility <ul style="list-style-type: none"> <li>Examines how compatible each alternative is with the existing road network and the ability to upgrade each alternative to meet future needs.</li> </ul> | a) Effect on traffic volumes on parallel/crossing roads<br>b) Effect on traffic operations on parallel/crossing roads<br>c) Consistency of design/operation<br>d) Length of construction period<br>e) Ability to stage implementation of the undertaking<br>f) Ability to upgrade undertaking as warranted by future needs |
|                   | 1.3 Cost <ul style="list-style-type: none"> <li>Examines the short- and long-term cost of each roadway alternative</li> </ul>  | a) Construction cost<br>b) Operating cost<br>c) Maintenance cost   |

| FACTOR                 | CRITERIA   | INDICATOR   |
|------------------------|--|---|
| 2. Natural Environment | 2.1 Fisheries and Aquatic Habitat <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on water quantity, quality, fish species and aquatic habitat.</li> </ul> | a) Water crossings or encroachments by stream order (lakes, rivers/streams, wetlands)<br>b) Permitted surface water intakes affected<br>c) Presence of species at risk (rare or endangered)<br>d) Areas of critical fish habitat (includes spawning areas, migratory runs)<br>e) Presence of warmwater/coldwater communities  |
|                        | 2.2 Wildlife <ul style="list-style-type: none"> <li>Examines the impact each alternative will have wildlife species and habitat.</li> </ul>  | a) Encroachment on or severance of forested vegetation or non-forested succession areas<br>b) Encroachment on or severance of greenways and open space linkages (wildlife travel corridors)<br>c) Encroachment on or severance of significant wildlife habitat (waterfowl areas, deer yards, heronries)<br>d) Presence of species at risk (rare or endangered)  |
|                        | 2.3 Wetlands <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on wetland resources.</li> </ul>  | a) Loss of function (biological, hydrological, special features) of all wetlands within or adjacent to study area<br>b) Loss of wetland area of all wetlands within study area<br>c) Degree of interaction of all wetlands with ground water<br>d) Encroachment on (within 120m) or severance of wetlands   |
|                        | 2.4 Vegetation <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on vegetation units and individual specimens</li> </ul>                                     | a) Encroachment on or severance of high quality forest stands (based on dominant species, age, size, shape)<br>b) Encroachment on or severance of Life Science ANSI's<br>c) Encroachment on or severance of ESA's<br>d) Encroachment on or severance of Oak Ridge Moraine Planning Area forests<br>e) Presence of significant species or specimens at risk (rare or endangered)<br>f) Encroachment on or severance of unusual vegetation units<br>g) Presence of riparian habitat |
|                        | 2.5 Ground Water <ul style="list-style-type: none"> <li>Examines the potential impact each alternative will have on ground water resources</li> </ul>  | a) Ground water recharge - highly permeable soil and susceptibility to contamination<br>b) Area of shallow ground water table affected<br>c) Permit to take water   |
|                        | 2.6 Geology <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on significant landforms</li> </ul>  | a) Encroachment on or severance of Earth Science ANSI's   |

## EVALUATION CRITERIA

# HIGHWAY 404 EXTENSION

## Davis Drive to Highway 12

### Route Planning Study and Environmental Assessment

EXHIBIT

4.15A

| FACTOR               | CRITERIA  | INDICATOR   |
|----------------------|---|---|
| 3 Social Environment | 3.1 Community Effects <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on communities, neighbourhoods, individuals, and related land uses (residential, institutional, recreational).</li> </ul> | a) Potential to displace existing residents<br>b) Potential to disrupt existing properties<br>c) Potential to displace institutional and recreational features<br>d) Potential to disrupt institutional and recreational features<br>e) Impact on community cohesion<br>f) Impact on community stability<br>g) Impact on community character<br>h) Potential disruption to emergency services<br>i) Potential to displace and/or disrupt planned development<br>j) Potential to impact future development<br>k) Potential reduction in community mobility |
|                      | 3.2 Aesthetics <ul style="list-style-type: none"> <li>Examines the visual impacts of each alternative.</li> </ul>   | a) Potential to visually impact the landscape of sensitive viewer groups  |
|                      | 3.3 Noise <ul style="list-style-type: none"> <li>Examines the noise impact each alternative will have on adjacent receivers.</li> </ul>   | a) Potential to increase levels at adjacent receivers   |

| FACTOR                  | CRITERIA  | INDICATOR  |
|-------------------------|---|--|
| 4. Economic Environment | 4.1 Agricultural <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on farming operations and employment.</li> </ul>   | a) Effect on future viability of existing farm operations<br>b) Effect on soil capability<br>c) Effect on linked farming operations farm operations  |
|                         | 4.2 Commercial/Industrial <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on commercial, industrial and tourism based businesses and employment.</li> </ul> | a) Potential to displace tourism features<br>b) Potential to disrupt tourism features (partial property taking)<br>c) Potential to displace commercial/industrial businesses<br>d) Potential to disrupt commercial/industrial businesses (partial property taking) |

| FACTOR                  | CRITERIA  | INDICATOR   |
|-------------------------|---|---|
| 5. Cultural Environment | 5.1 Archaeological <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on archaeological features.</li> </ul> | a) Number of registered sites directly impacted<br>b) Amount of land within 500 m of beach ridge<br>c) Amount of land within 200 m of water |
|                         | 5.2 Historical <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on heritage features.</li> </ul>           | a) Number of cultural landscapes to be displaced<br>b) Number of cultural landscapes to be disrupted  |

## EVALUATION CRITERIA

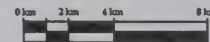
## ROUTE ALTERNATIVES AND DECISION POINTS

### LEGEND

ROUTE ALTERNATIVE



DECISION POINT



## HIGHWAY 404 EXTENSION

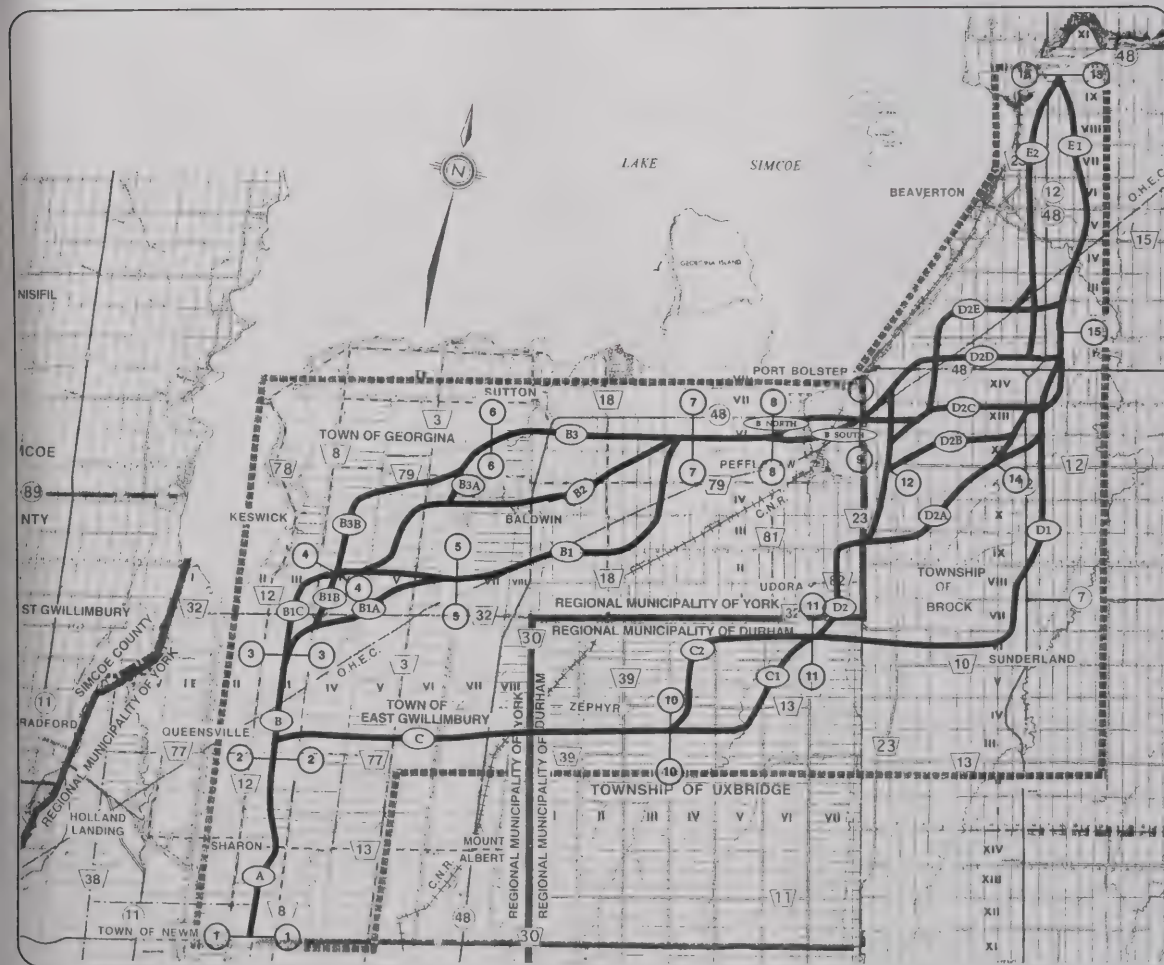
Davis Drive to Highway 12

Route Planning Study and  
Environmental Assessment

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Ministry of Transportation

EXHIBIT

4.16







## **4.5 SELECT PREFERRED ROUTE**

Two types of evaluation methods were utilized to identify the preferred alternative: 1) Trade-Off Method (Professional Judgment) and, 2) Weighting/Scoring Method.

### **4.5.1 Guiding Principles**

To ensure consistency in decision-making throughout the various route segment evaluations, as well as between the two evaluation methods, guiding principles were established prior to the route evaluation stage to identify a hierarchy of significance for the various impacts quantified during the analysis stage. These guiding principles, once established, were applied consistently throughout the evaluation process.

The guiding principles for determining the relative significance of each factor were developed by the Project Team as a whole, and are shown on Exhibit 4.17. Guiding principles were also established for criteria and indicators by the appropriate specialist(s) on the Project Team. These guiding principles are included in Appendix 6. In addition to a brief rationale for the relative significance of each factor assumed for the evaluation with the Trade-Off Method, Exhibit 4.17 also provides a numerical weight corresponding to the significance for use in the Weighting/Scoring Method.

### **4.5.2 Trade-Off Method (Professional Judgment)**

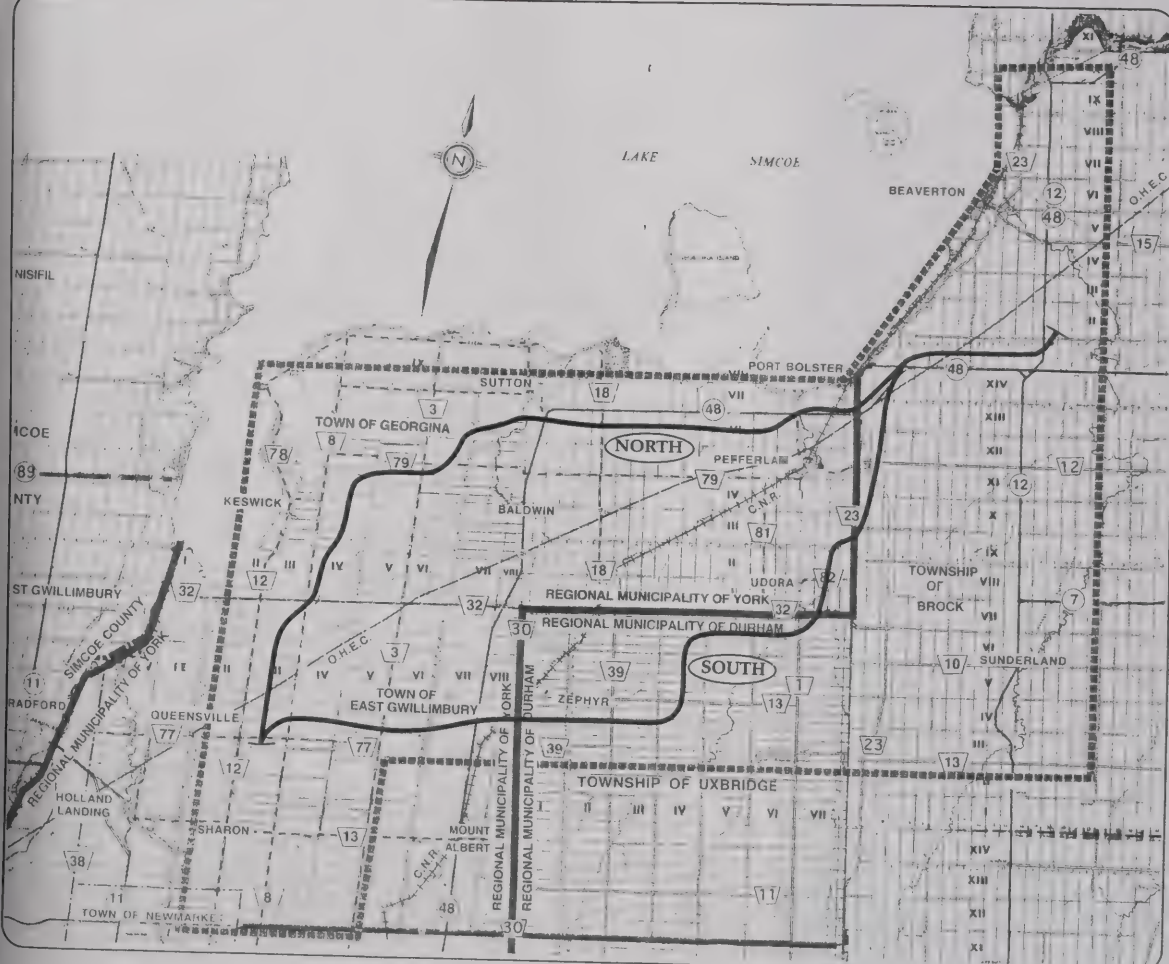
With this method, the differences in net impacts associated with the various route alternatives on a criteria basis are identified (net impacts are those impacts that remain after mitigation). Based on these differences, the advantages and disadvantages of each route alternative are "traded-off" against each other to select a preferred alternative. The trade-offs that favour the selection of one alternative over all others are based on the decision rules and the professional judgment of the Project Team, and are derived from the following sources:

- Government Legislation, Policies and Guidelines;
- Municipal Policy (i.e., Official Plans);
- Interest Group Issues and Concerns;
- Public Issues and Concerns; and
- Professional Expertise.

The results of the evaluation of the route alternatives, including the trade-offs identified by the Project Team, are provided in Exhibit 4.18. A summary of the results of the Trade-Off Method is provided immediately following Exhibit 4.18.

| FACTOR                 | DESCRIPTION/IMPORTANCE  | RELATIVE IMPORTANCE TO STUDY AREA | WEIGHT     |
|------------------------|---|-----------------------------------|------------|
| 1. TRANSPORTATION      | The study area limit and design standards used for the route alternatives ensure that any of the proposed routes will serve the study area adequately. Traffic operations and network compatibility will vary, depending on the siting of the facility. Transportation was therefore considered of moderate to high importance.   | Moderate to High Importance       | 20         |
| 2 NATURAL ENVIRONMENT  | At the corridor generation stage, the most sensitive natural environment areas (e.g. large contiguous provincially significant wetland areas) were identified and excluded from further consideration for locating route alternatives. The natural environment within the corridors was considered of equal significance to the social and economic environments.   | High Importance                   | 25         |
| 3 SOCIAL ENVIRONMENT   | At the corridor generation stage, the most sensitive social environment areas (e.g. areas of concentrated development) were identified and excluded from further consideration for locating route alternatives. The social environment within the corridors was considered of equal significance to the natural and economic environments.  | High Importance                   | 25         |
| 4 ECONOMIC ENVIRONMENT | At the route generation stage, impacts to agricultural areas were reduced by following property lines as much as possible. The economic environment within the corridors was considered of equal significance to the natural and social environments.   | High Importance                   | 25         |
| 5 CULTURAL ENVIRONMENT | At the route generation stage, impacts to the cultural environment were reduced by avoiding the most sensitive known cultural environment feature (e.g. historical settlements, cemeteries and known archaeological sites). Many of the remaining direct impacts to the cultural environment are also accounted for under the social environment factors (e.g. community effects, noise and aesthetics) and economic environment factors (e.g. agricultural impacts and commercial/industrial impacts). Giving high importance to the cultural and social environments, therefore, would unfairly skew the impacts towards the social environment. To avoid overemphasizing social impacts, the cultural environment was considered of low importance to the study area in comparison with the other factors. | Low Importance                    | 5          |
| <b>TOTAL</b>           |   |                                   | <b>100</b> |

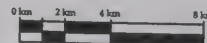




NORTH vs SOUTH

# LEGEND

STUDY AREA LIMIT



















## HIGHWAY 404 EXTENSION

Davis Drive to Highway 12  
Route Planning Study and  
Environmental Assessment

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EXHIBIT  
4.18A



| FACTOR/Criteria   | North Route   | South Route   | COMMENT   |
|---|---|---|---|
| <b>1. TRANSPORTATION</b>  |   |   |   |
| <b>1.1 Traffic Operations</b> <ul style="list-style-type: none"> <li>Examines how well each alternative will allow traffic to move through the study area.</li> </ul>   |    |    | <p>The North route is closer to urban development areas and will likely carry higher traffic volumes during peak travel periods. Similarly, traffic will consume less energy with the North route, because a greater length of their travel is free flow.</p> <p><b>The North route has a high benefit to traffic operations and the South route has a low benefit.</b></p>   |
| <b>1.2 Network Compatibility</b> <ul style="list-style-type: none"> <li>Examines how compatible each alternative is with the existing road network and the ability to upgrade each alternative to meet future needs.</li> </ul> |    |    | <p>The North route has a high benefit to traffic volumes on the road network, because the North route itself will carry much of the study area traffic, thereby reducing volumes on much of the study area road network. The South route will carry lower traffic volumes than the North route, therefore volumes on the road network will not be reduced as much. In addition, a smaller area of the road network will benefit from the South route. Therefore, the South route has a low benefit to traffic volumes.</p> <p>Similarly, with traffic volumes on the road network being lower with the North route, the road network will realize improved operations over a greater area with the North route than the South route. The road network has a minor improvement in operations with the South route, and a high improvement with the North route.</p> <p>The proximity of the North route to existing and future development will result in lower impacts to the local road network during staging than the South route since long-distance trips will not have to travel as far on local roads.</p> <p><b>The North route produces a high benefit to network compatibility and the South route has a low benefit.</b></p> |
| <b>1.3 Cost</b> <ul style="list-style-type: none"> <li>Examines the short- and long-term cost of each roadway alternative.</li> </ul>   |    |    | <p>The South route has more extensive wetland crossings which result in higher construction and maintenance costs than the North route.</p> <p><b>The North route has a low cost impact and the South route has a moderate cost impact.</b></p>   |
| <b>2. NATURAL ENVIRONMENT</b>   |   |   |   |
| <b>2.1 Fisheries and Aquatic Habitat</b> <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on water quantity, quality, fish species and aquatic habitat.</li> </ul>                         |    |    | <p>The South route crosses stream with critical habitat (brook trout spawning) and several potential cold water streams. The North route mainly impacts warm water streams (pike and bass) and also crosses critical habitat in Pepperlaw Brook (walleye migratory run) but spawning is unlikely to occur at the crossing.</p> <p><b>South route results in severe impacts to critical cold water habitat. The North route has moderate impacts to warm water communities.</b></p>  |
| <b>2.2 Wildlife</b> <ul style="list-style-type: none"> <li>Examines the impact each alternative will have wildlife species and habitat.</li> </ul>  |   |   | <p>The South route removes much more habitat and crosses more significant habitat units. The North route removes large areas of forest and disrupts significant species, but overall impacts are fewer and less severe.</p> <p><b>South route produces severe impacts to wildlife. The North route produces moderate impacts.</b></p>   |
| <b>2.3 Wetlands</b> <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on wetland resources.</li> </ul>  |  |  | <p>The South route crosses large wetland units associated with significant streams and wildlife corridors through forested crossings. North route removes half as much wetlands and results in fewer crossings.</p> <p><b>South route produces a severe impact on wetlands, while North route produces a moderate impact.</b></p>   |
| <b>2.4 Vegetation</b> <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on vegetation units and individual specimens.</li> </ul>  |  |  | <p>Both alternatives remove large areas of forest however, the South route impacts larger and higher quality stands and includes crossing an Environmentally Sensitive Area and areas of sensitive riparian habitat (seepage areas).</p> <p><b>South route produces a severe impact, while North route produces a moderate impact.</b></p>  |
| <b>2.5 Ground Water</b> <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on commercial and domestic water supply.</li> </ul>   |  |  | <p>The North route crosses large areas of highly permeable soil and relatively small areas of high ground water table. The South route crosses a much smaller area of highly permeable soil but a larger area of high ground water table.</p> <p><b>Both routes produce moderate impacts to ground water, but the South route produces slightly lower impacts.</b></p>  |
| <b>2.6 Geology</b> <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on significant landforms.</li> </ul>   | No Impact   | No Impact   | <p>No Earth Science ANSI's in vicinity of route alternatives.</p> <p><b>Neither alternative produces an impact.</b></p>   |



First Preference

















Second Preference

## EVALUATION OF ROUTE ALTERNATIVES - TRADE-OFF METHOD

### NORTH ROUTE VS. SOUTH ROUTE



| FACTOR/Criteria   | North Route   | South Route   | COMMENT  |
|---|---|---|--|
| <b>3 SOCIAL ENVIRONMENT</b>   |   |   |  |
| 3.1 Community Effects <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on communities, neighbourhoods, individuals, and related land uses (residential, institutional, recreational).</li> </ul> |    |    | <p>The South route produces lower overall community impacts because it results in fewer direct impacts to properties and has lower effects on social interaction.</p> <p><b>The North route results in high community effects and the South route produces moderate community effects.</b></p>                                   |
| 3.2 Aesthetics <ul style="list-style-type: none"> <li>Examines the visual impacts of each alternative.</li> </ul>   |    |    | <p>The South route impacts more farmstead residences, while the North route impacts more cluster residential areas. Overall, the North route impacts slightly more residences. <b>Both routes produce low visual impacts but, the South route produce slightly lower impacts.</b></p>  |
| 3.3 Noise <ul style="list-style-type: none"> <li>Examines the noise impact each alternative will have on adjacent receivers</li> </ul>  |    |    | <p>The North route results in increased noise levels for a greater number of residences than the South route.</p> <p><b>The North route produces a moderate impact the South route produces a low impact.</b></p>  |
| <b>4 ECONOMIC ENVIRONMENT</b>   |   |   |  |
| 4.1 Agricultural <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on farming operations and employment.</li> </ul>   |    |    | <p>The South route has a greater impact on soil capability than the North route; both routes have moderate impacts to farm operation units and linked operations.</p> <p><b>The South route produces high agricultural impacts. The North route results in moderate agricultural impacts.</b></p>                                |
| 4.2 Commercial/Industrial <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on commercial, industrial and tourism based businesses and employment.</li> </ul>                                     |    |    | <p>The North route has a higher potential to displace or disrupt existing businesses than the South route.</p> <p><b>The North route results in moderate impacts and the South route results in low impacts.</b></p>   |
| <b>5 CULTURAL ENVIRONMENT</b>   |   |   |  |
| 5.1 Archaeological <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on archaeological features.</li> </ul>   |  |  | <p>The North route impacts one Paleo-Indian site and impacts a greater area of land within 200 m of a watersource than the South route. The South route has a greater impact on registered sites (Iroquoian villages).</p> <p><b>Both alternatives produce low impacts. The North route produces slightly lower impacts.</b></p> |
| 5.2 Historical <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on heritage features.</li> </ul>   |  |  | <p>The North route displaces fewer cultural landscape units but disrupts slightly more landscape units than the South route.</p> <p><b>Both alternatives produce moderate impacts to heritage features. The North route produces slightly lower impacts.</b></p>   |

### SUMMARY OF TRADE-OFFS

The North route avoids the majority of the large wetland complexes in the study area and is located primarily within developed lands around the major urban development areas (Keswick, Sutton and Pefferlaw). As a result, the North route generates higher social environment impacts, and lower agricultural, natural and cultural environment impacts than the South route. The North route also generates higher transportation benefits than the South route.

Overall, the North route generates lower impacts and higher benefits than the South route.

**THEREFORE, THE NORTH ROUTE IS PREFERRED**



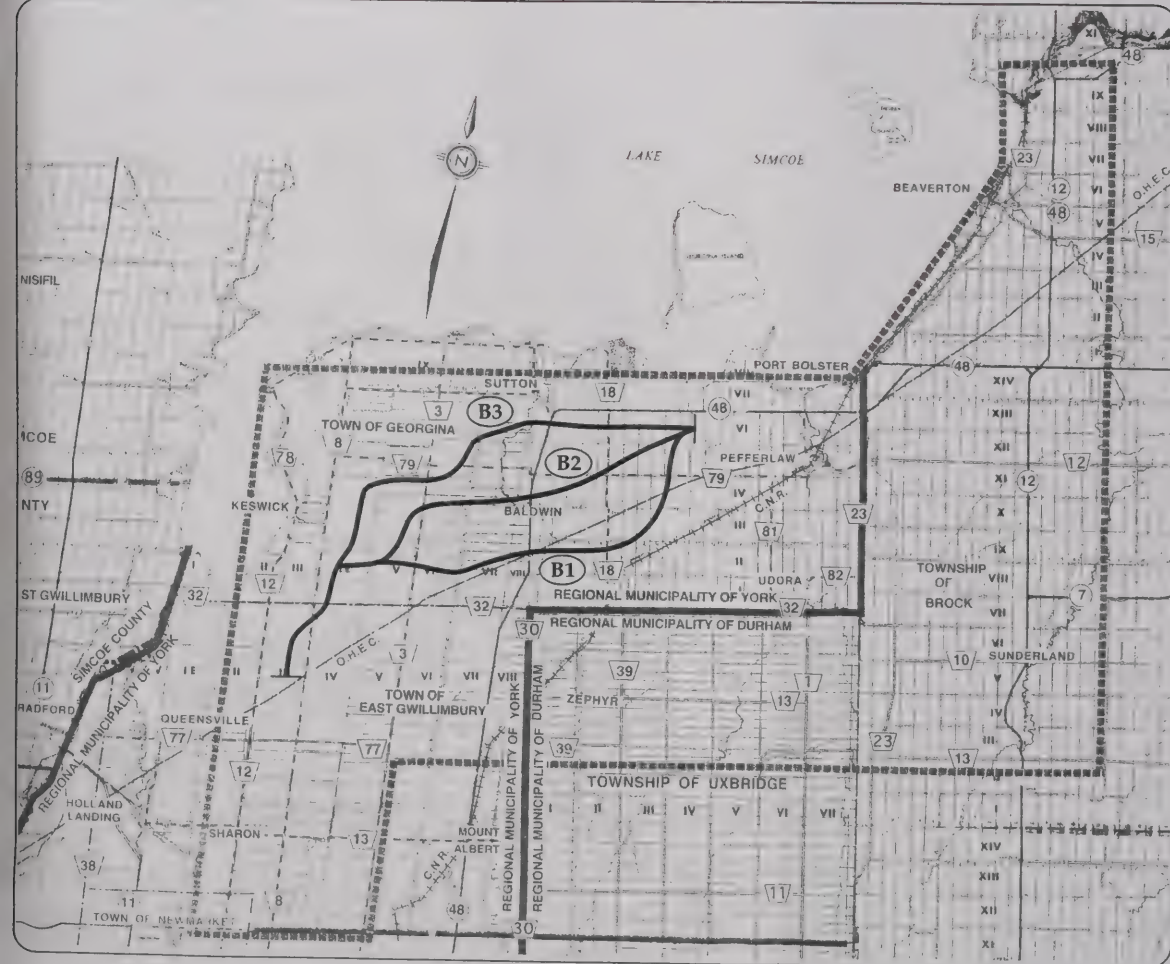
First Preference



Second Preference

## EVALUATION OF ROUTE ALTERNATIVES - TRADE-OFF METHOD

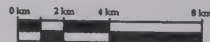
### NORTH ROUTE VS. SOUTH ROUTE



**B1 vs B2 vs B3**

### LEGEND

### STUDY AREA LIMIT



## HIGHWAY 404 EXTENSION

## Davis Drive to Highway 12

























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EXHIBIT

4.18D


























| FACTOR/Criteria   | B1  | B2  | B3  | COMMENT  |
|---|---|---|---|--|
| <b>1. TRANSPORTATION</b>  |   |   |   |  |
| <b>1.1 Traffic Operations</b> <ul style="list-style-type: none"> <li>Examines how well each alternative will allow traffic to move through the study area.</li> </ul>   |    |    |    | <p>B1 has higher energy usage than the other route alternatives primarily due to the greater distance between B1 and the major trip generating zones (Keswick and Sutton).</p> <p><b>B2 and B3 provide a high benefit to traffic operations. B1 provides moderate benefits to traffic operations.</b></p>  |
| <b>1.2 Network Compatibility</b> <ul style="list-style-type: none"> <li>Examines how compatible each alternative is with the existing road network and the ability to upgrade each alternative to meet future needs.</li> </ul> |    |    |    | <p>B3 is the closest to the major trip generating zones (Keswick and Sutton), compared to B2 and B1. This results in lower impacts to the area road network, because vehicles travel a relatively shorter distance on local roads. Traffic volumes on road sections connecting the highway to the major zones will meet or exceed capacity. Volumes on the remaining road sections will be reduced, compared to the do-nothing alternative. B1 and B2 are located further away from the major trip generating zones, and therefore have less of a benefit to the road network, with B1 providing the least benefit to traffic volumes on parallel/crossing roads.</p> <p>Similarly, for traffic operations, B3 produces a greater benefit to the area road network since traffic volumes are reduced over a greater area. The reduction in traffic volumes contributes to an improvement in traffic operations on the area road network. B1 provides the least benefit to traffic operations on parallel/crossing roads.</p> <p><b>B3 has a high benefit to network compatibility, B2 has a moderate and B1 has a low benefit.</b></p> |
| <b>1.3 Cost</b> <ul style="list-style-type: none"> <li>Examines the short- and long-term cost of each roadway alternative.</li> </ul>   |    |    |    | <p>B1 has a much higher cost impact than B2 and B3 because B1 requires additional structures over wetlands.</p> <p><b>B2 and B3 have low cost impacts with B2 having slightly lower impacts. B1 has a high impact.</b></p>   |
| <b>2. NATURAL ENVIRONMENT</b>   |   |   |   |  |
| <b>2.1 Fisheries and Aquatic Habitat</b> <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on water quantity, quality, fish species and aquatic habitat.</li> </ul>                         |    |    |    | <p>All three alternatives cross/encroach on pike habitat. B1 sustains slightly greater impacts to pike habitat due to lengthy and more numerous encroachments.</p> <p><b>Routes B1, B2, B3 all produce moderate impacts to fisheries, but B1 affects a larger area of critical habitat (pike spawning).</b></p>  |
| <b>2.2 Wildlife</b> <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on wildlife species and habitat.</li> </ul>   |    |    |    | <p>B1 has multiple crossings of large habitats, severance of a regional corridor and displaces two rare species. B2 and B3 have similar effects to local crossings and large habitat areas, but B3 has the potential to displace a provincially rare species.</p> <p><b>B1 produces high impacts while B2 produces moderate impacts slightly less severe than B3.</b></p>  |
| <b>2.3 Wetlands</b> <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on wetland resources.</li> </ul>  |  |  |  | <p>B1 crosses extensive wetland, much of it marsh; B2 crosses low areas of wetland with low encroachment on wetland areas (through forests); B3 has no wetland crossings but small encroachments through soil with high interaction with ground water</p> <p><b>B1 produces severe impacts, B3 moderate impacts, and B2 produces low impacts.</b></p>  |
| <b>2.4 Vegetation</b> <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on vegetation units and individual specimens.</li> </ul>  |  |  |  | <p>B1 has low forest area lost but crosses through significant vegetation including an ESA. B3 has moderate forest lost through significant vegetation units. B2 has high forest area lost but crosses through less sensitive forest patches.</p> <p><b>B1 and B3 produce similar moderate impacts with B1 being slightly more so, B2 produces low impacts.</b></p>  |
| <b>2.5 Ground Water</b> <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on commercial and domestic water supply.</li> </ul>   |  |  |  | <p>B1 has minor areas of highly permeable soil and areas sensitive to contamination, but has relatively large areas of high ground water table.</p> <p>B2 has minor areas of highly permeable soil and areas sensitive to contamination</p> <p>B3 has minor areas of highly permeable soils, areas sensitive to contamination and high ground water table.</p> <p>No permits to take water occur near any of these routes</p> <p><b>B1 produces a moderate impact. B2 and B3 both produce low impacts with B2 being slightly more preferred.</b></p>   |
| <b>2.6 Geology</b> <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on significant landforms.</li> </ul>   | No Impact   | No Impact   | No Impact   | <p>All three routes have no Earth Science ANST's within 300 m of the route.</p> <p>No Impact.</p>  |

 First Preference
  Second Preference
  Third Preference

## EVALUATION OF ROUTE ALTERNATIVES - TRADE-OFF METHOD

### PREFERRED B (B1 vs. B2 vs. B3)

| FACTOR/Criteria   | B1  | B2  | B3  | COMMENT   |
|---|---|---|---|---|
| <b>3 SOCIAL ENVIRONMENT</b>   |   |   |   |   |
| 3.1 Community Effects <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on communities, neighbourhoods, individuals, and related land uses (residential, institutional, recreational).</li> </ul> |    |    |    | B2 has the highest overall impact as it effects the highest number of residences as well as having the highest overall impact to community cohesion, stability and character. Overall, B1 & B3 produce similar impacts but B3 has slightly higher impacts.<br><br>B2 produces a high impact. B1 and B3 produce moderate impacts with B1 being slightly preferred. |
| 3.2 Aesthetics <ul style="list-style-type: none"> <li>Examines the visual impacts of each alternative.</li> </ul>   |    |    |    | B2 visually impacts more residences.<br><br>B2 produces a high impact. B1 and B3 produce low impacts with B1 being slightly preferred.  |
| 3.3 Noise <ul style="list-style-type: none"> <li>Examines the noise impact each alternative will have on adjacent receivers.</li> </ul>   |    |    |    | B3 has the highest impact followed by B2 and B1 respectively<br><br>B3 produce a high impacts. B2 produces moderate impacts. B1 produce low impacts. preferred.   |
| <b>4 ECONOMIC ENVIRONMENT</b>   |   |   |   |   |
| 4.1 Agricultural <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on farming operations and employment.</li> </ul>   |    |    |    | B3 has the greatest impact to operational viability, soil capability and linked farm operations. B2 has similar but slightly less impact than B3. B1 has the lowest impact.<br><br>B1 results in a low agricultural impact. B2 and B3 produce a moderate impact, with B2 slightly preferred.  |
| 4.2 Commercial/Industrial <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on commercial, industrial and tourism based businesses and employment.</li> </ul>                                     |    |    |    | B2 has the highest impact as it displaces the airport.<br><br>B2 and B1 produce a high impact. B3 produces a moderate impact.   |
| <b>5 CULTURAL ENVIRONMENT</b>   |   |   |   |   |
| 5.1 Archaeological <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on archaeological features.</li> </ul>   |    |    |    | B1 has the least amount of land within 500 metres of beach ridge and has no direct impacts to known sites. While B1 does have more land within 200 m of water impacted than B2, B1 has considerably less land impacted than B3.<br><br>B1 produces a low impact. B2 and B3 produce similar moderate impacts.  |
| 5.2 Historical <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on heritage features.</li> </ul>   |  |  |  | B3 is considered to have the least adverse impact having the lowest number of cultural landscape units displaced. B3 has slightly greater cultural landscape unit disruption effects than B1 and slightly less disruption effects than B2.<br><br>All Alternatives produce moderate impacts, but B3 is slightly preferred.  |

### SUMMARY OF TRADE-OFFS

Alternative B1 follows the border between developed and natural areas in central Georgina and avoids the existing communities. As a result, this alternative generates the lowest social environment impacts and the greatest impact to the natural environment, particularly to the Black River Wetland Complex. B1 also provides the lowest transportation benefits.

To reduce impacts to the natural environment, Alternative B2 was located primarily within the developed lands outside the natural areas. As a result, this alternative generates the highest social environment impacts, particularly through Baldwin, and the lowest natural environment impacts. The transportation benefits with B2 are greater than those of B1.

Alternative B3 was located alongside the boundaries of the major development areas in Georgina (Keswick and Sutton). By avoiding the Black River Wetland Complex, the impacts to the natural environment with B3 are less than those of B1, but slightly greater than those of B2. As well, by passing between Baldwin/Elm Grove and Sutton, the impacts to the social environment are less than those of B2, but slightly greater than those of B1. B3 also generates the greatest benefits to transportation.

Overall, B3 generated the least impacts and the highest benefits.

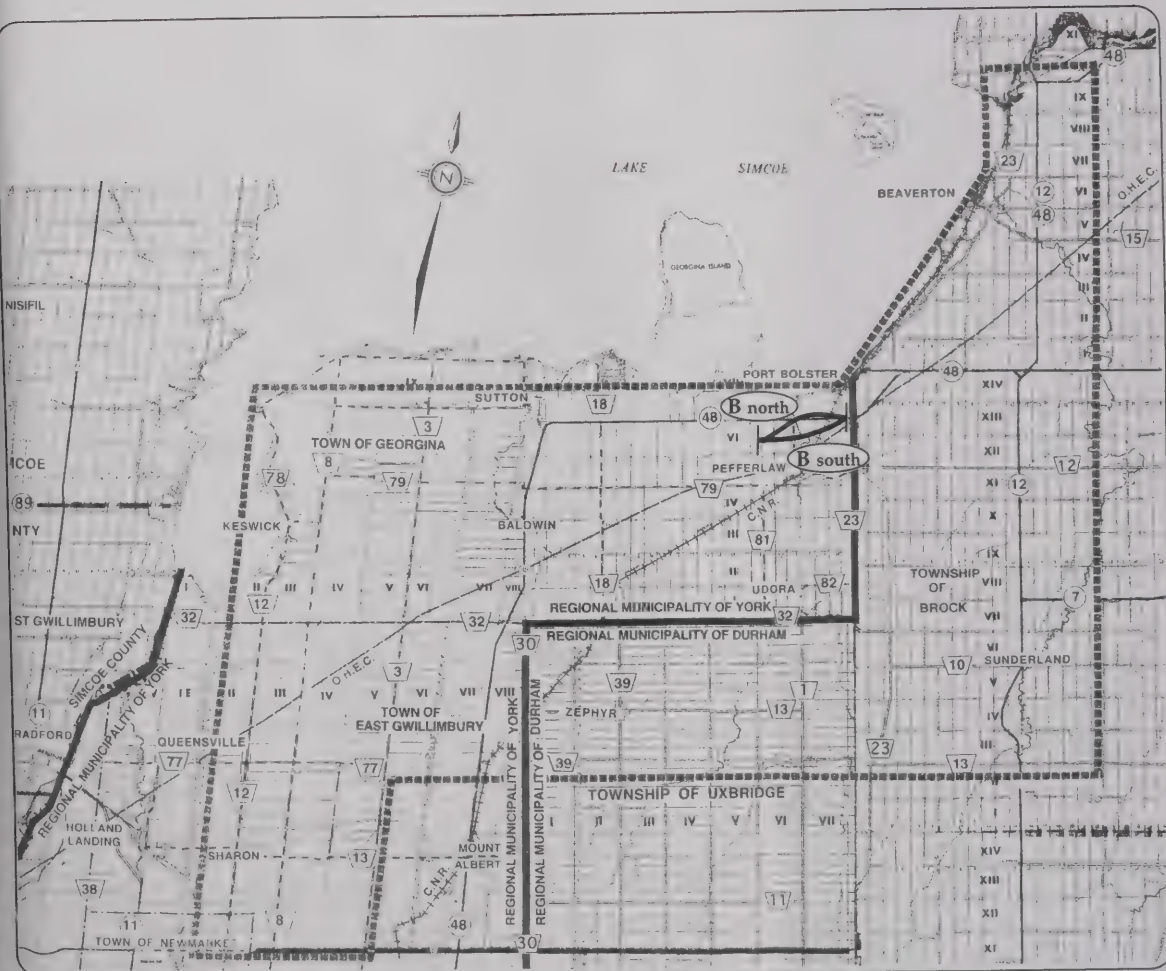
**THEREFORE, B3 IS PREFERRED**

 First Preference
  Second Preference
  Third Preference

## EVALUATION OF ROUTE ALTERNATIVES - TRADE-OFF METHOD

### PREFERRED B (B1 vs. B2 vs. B3)

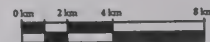




B NORTH vs B SOUTH

# LEGEND

STUDY AREA LIMIT



## HIGHWAY 404 EXTENSION

Davis Drive to Highway 12  
Route Planning Study and  
Environmental Assessment







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4.18c





| FACTOR/Criteria  | B North   | B South   | COMMENT  |
|--|---|---|--|
| <b>1. TRANSPORTATION</b>   |   |   |  |
| 1.1 Traffic Operations <ul style="list-style-type: none"> <li>Examines how well each alternative will allow traffic to move through the study area.</li> </ul>   | SAME  | SAME  | No significant differences in traffic operations between the two routes.<br><br><b>Both alternative provide a low benefit to traffic operations.</b>   |
| 1.2 Network Compatibility <ul style="list-style-type: none"> <li>Examines how compatible each alternative is with the existing road network and the ability to upgrade each alternative to meet future needs.</li> </ul> | SAME  | SAME  | Both alternatives can be upgraded to three lanes per direction, which is sufficient for the long-range (30 years +) planning horizon. B North, however, cannot be upgraded to four lanes per direction, due to the reduced median width at the Pepperlaw Brook crossing. Since a fourth lane is not required in the foreseeable future, the two routes were considered to provide the same benefits to Network Compatibility.<br><br><b>Both alternative provide a low benefit to network compatibility.</b> |
| 1.3 Cost <ul style="list-style-type: none"> <li>Examines the short- and long-term cost of each roadway alternative.</li> </ul>   |    |    | B-North carries a higher construction cost than B-South due primarily to higher property costs.<br><br><b>B-North has a moderate cost impact and B-South has a low cost impact.</b>  |
| <b>2. NATURAL ENVIRONMENT</b>  |   |   |  |
| 2.1 Fisheries and Aquatic Habitat <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on water quantity, quality, fish species and aquatic habitat.</li> </ul>                         | SAME  | SAME  | Both alternatives produce similar impacts to critical habitat (walleye migratory run and bass spawning). Both alternatives have similar impacts to Lake Simcoe.<br><br><b>Both alternatives produce similar moderate impacts.</b>  |
| 2.2 Wildlife <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on wildlife species and habitat.</li> </ul>   |    |    | The habitat is generally better in B South route; the presence of area-sensitive species indicates higher functioning habitat on the B South route. B South also results in a greater loss of habitat area.<br><br><b>B North produces low impacts to wildlife, while B South produces moderate impacts.</b>   |
| 2.3 Wetlands <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on wetland resources.</li> </ul>  | No Impact   | No Impact   | No wetlands were crossed or encroached upon by either corridor<br><br><b>Neither alternative produces an impact.</b>   |
| 2.4 Vegetation <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on vegetation units and individual specimens.</li> </ul>  |  |  | A large forested area (22 ha) is crossed in B South corridor which supports a large number of significant flora and fauna.<br><br><b>B North produces a low impact on vegetation and B South produces a high impact.</b>   |
| 2.5 Ground Water <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on commercial and domestic water supply.</li> </ul>   | SAME  | SAME  | Relatively small areas of highly permeable soil crossed. No areas of shallow ground water table. No permits to take water. Relatively small areas sensitive to ground water contamination.<br><br><b>Neither alternative produces a significant impact.</b>  |
| 2.6 Geology <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on significant landforms.</li> </ul>   | No Impact   | No Impact   | No Earth Science ANSI's in vicinity of alignment.<br><br><b>Neither alternative produces an impact.</b>  |

















First Preference



Second Preference

## EVALUATION OF ROUTE ALTERNATIVES - TRADE-OFF METHOD

### PREFERRED PEPPERLAW CROSSING (B NORTH VS. B SOUTH)

| FACTOR/Criteria  | B North   | B South   | COMMENT  |
|--|---|---|--|
| <b>3 SOCIAL ENVIRONMENT</b>  |   |   |  |
| <b>3.1 Community Effects</b> <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on communities, neighbourhoods, individuals, and related land uses (residential, institutional, recreational).</li> </ul> |    |    | <p>Both alternatives sever the Pepperlaw community and therefore have an extreme negative impact to this community. However, in choosing between the two alternatives B North contains more of the impacts within the existing Highway 48 corridor area, rather than introducing a new corridor. Therefore, B North is preferred.</p> <p><b>Route B North produces a moderate impact to community effects and B South produces a high impact to community effects.</b></p> |
| <b>3.2 Aesthetics</b> <ul style="list-style-type: none"> <li>Examines the visual impacts of each alternative.</li> </ul>   |    |    | <p>B North visually impacts more residences.</p> <p><b>B North produces a moderate aesthetic impact and B South produces a low impact.</b></p>   |
| <b>3.3 Noise</b> <ul style="list-style-type: none"> <li>Examines the noise impact each alternative will have on adjacent receivers.</li> </ul>   |    |    | <p>Although B North impacts slightly more residences than B South, the impacts associated with B South are more severe. Impacts along B North are less due to its proximity to the Highway 48 Corridor.</p> <p><b>Both alternatives produce moderate impacts but B North is slightly preferred.</b></p>  |
| <b>4 ECONOMIC ENVIRONMENT</b>  |   |   |  |
| <b>4.1 Agricultural</b> <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on farming operations and employment.</li> </ul>   |    |    | <p>B North has slightly higher impacts to operational viability than B South. B South has slightly higher impacts to soil capability.</p> <p><b>Both alternatives produce a low impact to agriculture, but B South produces slightly lower impacts.</b></p>  |
| <b>4.2 Commercial/Industrial</b> <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on commercial, industrial and tourism based businesses and employment.</li> </ul>                                     |    |    | <p>B North has higher displacement and disruption impacts and, therefore, is worse than B South.</p> <p><b>Route B North produces a moderate impact to commercial/industrial and B South produces a low impact to commercial/industrial.</b></p>   |
| <b>5 CULTURAL ENVIRONMENT</b>  |   |   |  |
| <b>5.1 Archaeological</b> <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on archaeological features.</li> </ul>   |   |   | <p>Both alternatives have virtually identical impacts except that B North is further away from a registered site.</p> <p><b>Both alternatives produce low impacts but B North is slightly preferred.</b></p>   |
| <b>5.2 Historical</b> <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on heritage features.</li> </ul>   |  |  | <p>B South displaces fewer cultural landscape units than B North.</p> <p><b>B South produces low displacement impacts. B North produces moderate impacts.</b></p>  |

### SUMMARY OF TRADE-OFFS

The impacts associated with B North are primarily focussed on the existing highway corridor. This alternative would impact existing businesses along Highway 48 and would require additional bridge construction to maintain access to lands east of the Pepperlaw Brook.

With B South, a new highway corridor would be constructed south of Highway 48. This alternative would result in a new corridor through Pepperlaw, which would have higher community impacts than B North, and impacts to the natural areas east of the Pepperlaw Brook.

The impacts to the community as a whole and the natural areas east of Pepperlaw Brook were considered of greater importance than those to the businesses along Highway 48.

**THEREFORE, B North IS PREFERRED**



First Preference

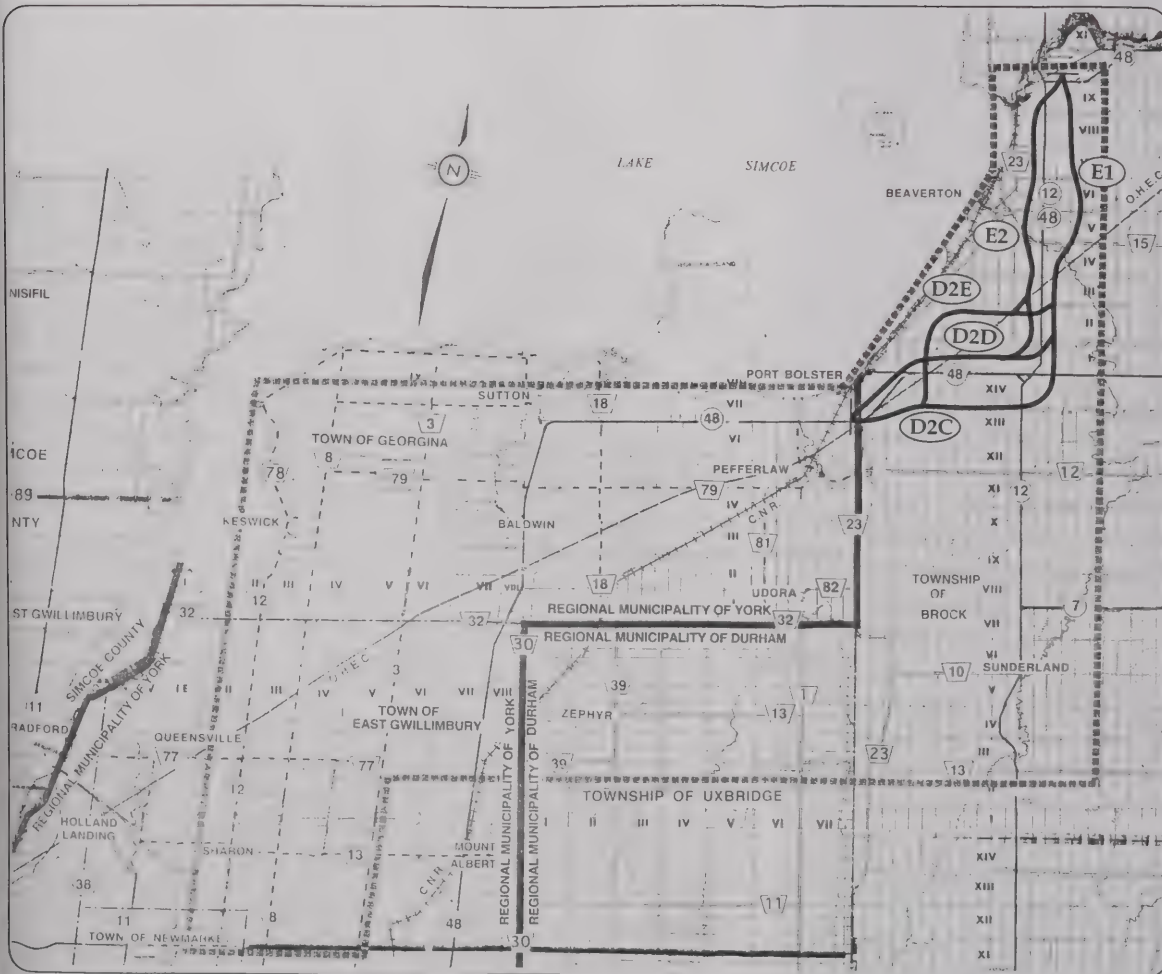


Second Preference

## EVALUATION OF ROUTE ALTERNATIVES - TRADE-OFF METHOD

### PREFERRED PEPPERLAW CROSSING (B NORTH VS. B SOUTH)

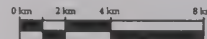




D2C/E1 vs D2D/E1 vs D2D/E2 vs  
D2E/E1 vs D2E/E2

### LEGEND

#### STUDY AREA LIMIT



## HIGHWAY 404 EXTENSION

## Davis Drive to Highway 12

 **Ontario**  
Ministry of Transportation

EXHIBIT

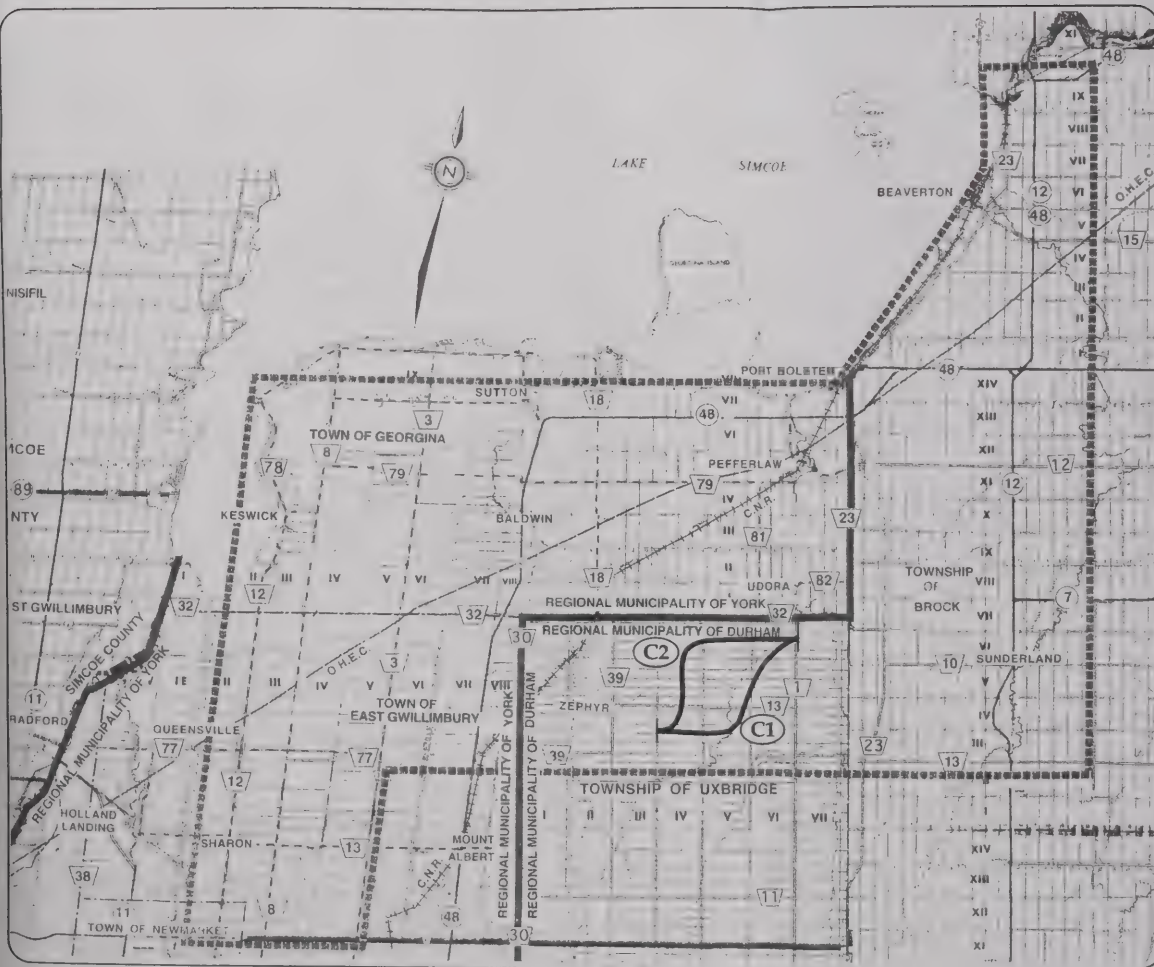
4.18<sub>J</sub>



| FACTOR/Criteria   | D2C/E1 | D2D/E1 | D2D/E2 | D2E/E1 | D2E/E2 | COMMENT   |
|---|--------|--------|--------|--------|--------|---|
| <b>1. TRANSPORTATION</b>  |        |        |        |        |        |   |
| 1.1 Traffic Operations<br>• Examines how well each alternative will allow traffic to move through the study area.   | SAME   | SAME   | SAME   | SAME   | SAME   | There is no significant difference among the alternatives in terms of traffic operations. All routes generate the same benefits.  |
| 1.2 Network Compatibility<br>• Examines how compatible each alternative is with the existing road network and the ability to upgrade each alternative to meet future needs. | SAME   | SAME   | SAME   | SAME   | SAME   | All alternatives provide a low benefit to traffic operations.<br><br>There is no significant difference among the alternatives in terms of network compatibility. All routes generate the same benefits.  |
| 1.3 Cost<br>• Examines the short- and long-term cost of each roadway alternative.   | 3rd    | 3rd    | 2nd    | 3rd    | 1st    | All alternatives provide a low benefit to network compatibility.<br><br>Generally, the E2 routes are less expensive than the E1 routes because the E1 routes are slightly longer and require additional structures over wetlands.<br><b>D2D/E2 and D2E/E2 have low cost impacts, with D2E/E2 having slightly lower impacts. D2C/E1, D2D/E1 and D2E/E1 have moderate cost impacts.</b>   |
| <b>2. NATURAL ENVIRONMENT</b>   |        |        |        |        |        |   |
| 2.1 Fisheries and Aquatic Habitat<br>• Examines the impact each alternative will have on water quantity, quality, fish species and aquatic habitat.                         | 2nd    | 1st    | 3rd    | 1st    | 3rd    | All route impacts of D2D/E2 and D2E/E2 are the same (crossing of known critical habitat - walleye spawning). Total destruction of this habitat is not expected. D2C/E1 encroaches on potential cold water habitat; it also crosses 2 and 3 km upstream of critical habitat (walleye spawning). D2D/E1 and D2E/E1 share comparable impacts (2 and 3 km upstream of critical habitat - walleye spawning).<br><b>D2E/E2 and D2D/E2 produce high impacts to fisheries and aquatic habitat, while D2C/E1, D2D/E1 and D2E/E1 produce moderate impacts with D2C/E1 having slightly greater impacts.</b>  |
| 2.2 Wildlife<br>• Examines the impact each alternative will have on wildlife species and habitat.   | 3rd    | 3rd    | 2nd    | 2nd    | 1st    | D2C/E1, D2D/E1 and D2D/E2 routes have higher impacts on the area's sensitive species (proximity to heronry). D2E/E1 has higher impacts to forested habitat.<br><b>D2E/E2 has low impacts to wildlife, D2D/E2 and D2E/E1 have moderate impacts, and D2C/E1 and D2D/E1 have high impacts.</b>   |
| 2.3 Wetlands<br>• Examines the impact each alternative will have on wetland resources.  | 5th    | 4th    | 1st    | 3rd    | 2nd    | D2C/E1 crosses standing water in the high quality Gibson Hill Swamp. The Swamp has a high interaction with ground water. D2D/E1 crosses the same wetland, but along an existing disturbance at the extreme north edge. D2D/E2 has similar wetland impacts to the latter. D2E/E1 has a small wetland impact while D2E/E2 avoids the wetland.   |
| 2.4 Vegetation<br>• Examines the impact each alternative will have on vegetation units and individual specimens.  | 5th    | 4th    | 1st    | 3rd    | 2nd    | <b>D2C/E1 produces high impacts to wetlands. D2D/E2 and D2D/E1 produce moderate impacts, D2E/E1 produces a low impact and D2E/E2 has no impact.</b><br><br>The E1 routes cross much larger areas of forest than the E2 routes. Within this forest, more locally significant species and locally significant vegetation units are encountered. Therefore, all the E1 routes produce higher impacts than the E2 routes.<br><br>Of the E1 routes, D2C/E1 passes by the most sensitive vegetation along the route (fen). D2E/E1 creates a new corridor through a sequence of forested habitat and wetland habitat, while D2D/E1 runs parallel to an existing route which has already been subject to highway impacts. Therefore the impact produced by D2D/E1 would be less than that produced by D2E/E1. The same comments apply to a comparison of D2E/E2 and D2D/E2. |
| 2.5 Ground Water<br>• Examines the impact each alternative will have on commercial and domestic water supply.   | 1st    | 3rd    | 2nd    | 4th    | 3rd    | <b>D2C/E1, D2D/E1 and D2E/E1 produce moderate impacts to vegetation, with D2C/E1 producing slightly higher impacts and D2E/E1 slightly lower impacts. D2D/E2 and D2E/E2 produce low impacts, with D2D/E2 producing the lowest impacts to vegetation of the five alternatives.</b><br><br>Relatively large areas of permeable soils are crossed by the five route alternatives with D2E/E1 crossing the largest area and D2C/E1 crossing the least. D2E/E1 also crosses the largest area with high water table. D2E/E2 has the least impact as it does not cross any areas with a high water table.<br><b>D2E/E1 produces high impacts to ground water, while D2D/E1 and D2E/E2 produce moderate impacts. D2C/E1 and D2D/E2 produce low impacts, with D2C/E1 producing slightly lower impacts.</b>   |
| 2.6 Geology<br>• Examines the impact each alternative will have on significant landforms.   | SAME   | SAME   | SAME   | SAME   | SAME   | No Earth Science ANSI's in vicinity of alignment<br><br>None of the alternatives produce an impact.   |



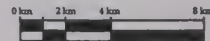
| FACTOR/Criteria  | D2C\E1 | D2D\E1 | D2D\E2 | D2E\E1 | D2E\E2 | COMMENT  |
|--|--------|--------|--------|--------|--------|--|
| <b>3 SOCIAL ENVIRONMENT</b><br>3.1 Community Effects <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on communities, neighbourhoods, individuals, and related land uses (residential, institutional, recreational)</li> </ul>  | 2nd    | 1st    | 3rd    | 2nd    | 3rd    | <p>All the alternatives linearly split Brock Township. However the alternative which connects to E2 add the impact of splitting the Beaverton area as well. Therefore, D2C/E1, D2D/E1 and D2E/E1 are preferred to D2D/E2 and D2E/E2. Of D2C/E1, D2D/E1, and D2E/E1, D2D/E1 is slightly preferred as utilizing the existing highway corridor is more consistent with the existing character of the area</p> <p>D2C/E1, D2D/E1, D2E/E1 produce moderate impact to community effects but D2D/E1 produces slightly lower community effects. D2D/E2 and D2E/E2 produce high community effects.</p> <p>Alternatives which connect to E2 visually impact more residents than E2. Impacts along the D segments are similar. Therefore, D2C/E1, D2D/E1 and D2E/E1 are preferred</p> <p>D2C/E1, D2D/E1, D2E/E1 produce moderate aesthetics impacts but D2D/E1 produces slightly lower impacts. D2D/E2 and D2E/E2 produce high aesthetics impacts.</p> <p>The number of noise sensitive receivers experiencing an increase above existing is much lower with those alternatives which connect to E1. D2D minimizes impacts to those residences in the existing Highway 48 corridor. Therefore, D2D/E1 is preferred</p> <p>D2D/E1 produces a low impact, D2C/E1 and D2E/E1 produce moderate noise impacts, and D2D/E2 and D2E/E2 produce high noise impacts.</p> |
| 3.2 Aesthetics <ul style="list-style-type: none"> <li>Examines the visual impacts of each alternative.</li> </ul>  | 2nd    | 1st    | 3rd    | 2nd    | 3rd    |  |
| 3.3 Noise <ul style="list-style-type: none"> <li>Examines the noise impact each alternative will have on adjacent receivers.</li> </ul>  | 2nd    | 1st    | 3rd    | 2nd    | 3rd    |  |
| <b>4 ECONOMIC ENVIRONMENT</b><br>4.1 Agricultural <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on farming operations and employment.</li> </ul>   | 2nd    | 1st    | 2nd    | 2nd    | 2nd    | <p>All routes produce high impacts to agricultural viability, but Routes D2D/E1 and D2D/E2 produce slightly lower impacts. All routes produce high impacts to soil capability except Route D2D/E1, which produces moderate impacts. The routes generally produce moderate impacts to linked farming operations, except the D2D routes, which produce low impacts.</p> <p>Route D2D/E1 produces moderate impacts to agriculture and the other routes produce high impacts to agriculture.</p>   |
| 4.2 Commercial/Industrial <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on commercial, industrial and tourism based businesses and employment.</li> </ul>  | 1st    | 2nd    | 2nd    | 1st    | 1st    |  |
| <b>5 CULTURAL ENVIRONMENT</b><br>5.1 Archaeological <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on archaeological features.</li> </ul>   | 2nd    | 1st    | 1st    | 1st    | 1st    | <p>D2C/E1 has more impacts to areas in proximity to beach ridge and water.</p> <p>D2C/E1 produces moderate impacts while all other alternatives produce similar low impacts.</p>   |
| 5.2 Historical <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on heritage features.</li> </ul>  | 4th    | 1st    | 2nd    | 5th    | 3rd    | <p>D2D/E1 displaces least number of cultural landscape units and disrupts low number of cultural landscape units</p> <p>All alternatives have moderate impacts, with D2D/E1 having the overall lowest impacts.</p>   |
| <b>SUMMARY OF TRADE-OFFS</b><br>Alternatives that connect to E1 were preferred to E2 because the lower social environment impacts more than offset the natural environment impacts. D2E/E1 was preferred to D2C/E1 because of much lower overall effects. D2D/E1 was preferred over D2E/E1 because the lower agricultural and social environment impacts more than offset the natural environment impacts<br><b>THEREFORE, D2D\E1 IS PREFERRED</b> |        |        |        |        |        |  |



C1 vs C2

## LEGEND

STUDY AREA LIMIT



## HIGHWAY 404 EXTENSION

Davis Drive to Highway 12

Route Planning Study and  
Environmental Assessment















Ministry of Transportation

EXHIBIT

4.18M





| FACTOR/Criteria  | C1  | C2  | COMMENT   |
|--|---|---|---|
| <b>1. TRANSPORTATION</b>   |   |   |   |
| 1.1 Traffic Operations <ul style="list-style-type: none"> <li>Examines how well each alternative will allow traffic to move through the study area.</li> </ul>   |    |    | C2 has a higher energy usage because it is longer than C1. The terrain on C1 is more rolling, increasing potential for slow moving vehicles.<br><br><b>C1 has a moderate benefit to traffic operations, C2 has a low benefit.</b>   |
| 1.2 Network Compatibility <ul style="list-style-type: none"> <li>Examines how compatible each alternative is with the existing road network and the ability to upgrade each alternative to meet future needs.</li> </ul> | SAME  | SAME  | Effect on traffic volumes and operations on parallel/crossing roads and staging ability cannot be appropriately assessed for these minor route segments. On the remaining indicators, no significant differences were found between the two routes.<br><br><b>Both routes produce low benefits to network operations.</b>   |
| 1.3 Cost <ul style="list-style-type: none"> <li>Examines the short- and long-term cost of each roadway alternative.</li> </ul>   |    |    | C2 carries generally higher costs than C1 because C2 is slightly longer and requires additional structures over wetlands.<br><br><b>Both routes have low cost impacts, with C1 having slightly lower impacts.</b>   |
| <b>2. NATURAL ENVIRONMENT</b>  |   |   |   |
| 2.1 Fisheries and Aquatic Habitat <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on water quantity, quality, fish species and aquatic habitat.</li> </ul>                         |    |    | Both routes cross potential critical habitat (brook trout migratory run) (similar impacts). C1 also impacts a sensitive fish (sculpin) community and potential critical habitat (brook trout spawning). C1 potentially impact the habitat of a vulnerable species.<br><br><b>C2 produces low impacts to fisheries and aquatic habitat while C1 produces high impacts.</b> |
| 2.2 Wildlife <ul style="list-style-type: none"> <li>Examines the impact each alternative will have wildlife species and habitat.</li> </ul>  |    |    | C1 and C2 both cross high-quality habitat, with C1 displacing slightly more rare species and isolating a small wetland unit (interferes with wildlife use).<br><br><b>C1 and C2 both produce high impacts to wildlife, with C1 being slightly more severe.</b>  |
| 2.3 Wetlands <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on wetland resources.</li> </ul>  | SAME  | SAME  | Greater wetland area was crossed by C2, however, this wetland has already been segmented. The wetland crossings on C1 are smaller, but functionally more severe as they represent new impacts. Therefore, the impacts to wetlands are similar for both alternatives.<br><br><b>Both alternatives produce a similar high impact to wetlands.</b>                           |
| 2.4 Vegetation <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on vegetation units and individual specimens.</li> </ul>  |  |  | ANSI and ESA areas crossed by route C1. Larger number of significant species found in C1 corridor.<br><br><b>C2 produces a moderate impact while C1 produces a high impact.</b>   |
| 2.5 Ground Water <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on commercial and domestic water supply.</li> </ul>   |  |  | Both routes cross relatively small areas of highly permeable soil and areas sensitive to contamination. C1 crosses relatively small area of high ground water table and C2 crosses relatively large area of high ground water table. One permit to take water near C1.<br><br><b>C1 produces a low impact to ground water while C2 produces a moderate impact.</b>        |
| 2.6 Geology <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on significant landforms.</li> </ul>   | No Impact   | No Impact   | No Earth Science ANSI's in vicinity of alignment<br><br><b>Neither alignment produces an impact.</b>  |















First Preference



Second Preference

## EVALUATION OF ROUTE ALTERNATIVES - TRADE-OFF METHOD

### PREFERRED C (C1 VS C2)

| FACTOR/Criteria  | C1  | C2  | COMMENT  |
|--|---|---|--|
| <b>3 SOCIAL ENVIRONMENT</b><br><br>3.1 Community Effects <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on communities, neighbourhoods, individuals, and related land uses (residential, institutional, recreational).</li> </ul> |    |    | C1 and C2 produce similar impacts but C1 is slightly preferred because it has less of an impact on emergency response time and recreational disruption (snowmobile trails).<br><br>Both alternatives produce low impacts but C1 produces slightly lower impacts. |
| 3.2 Aesthetics <ul style="list-style-type: none"> <li>Examines the visual impacts of each alternative</li> </ul>   |    |    | C2 visually impacts more farmstead residences.<br><br>C1 and C2 both produce a moderate aesthetics impact but C1 produces slightly lower aesthetic impacts.  |
| 3.3 Noise <ul style="list-style-type: none"> <li>Examines the noise impact each alternative will have on adjacent receivers.</li> </ul>  |    |    | Both alternatives produce similar impacts but C1 results in slightly higher impacts.<br><br>C1 and C2 produce a moderate noise impact but C2 is slightly preferred.  |
| <b>4 ECONOMIC ENVIRONMENT</b><br><br>4.1 Agricultural <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on farming operations and employment.</li> </ul>   |    |    | C2 produces slightly higher operational viability impacts, and slightly lower impacts to linked farming operations. Soil capability impacts are equal.<br><br>Both routes produce moderate impacts to agriculture, but Route C1 produces slightly lower impacts. |
| 4.2 Commercial/Industrial <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on commercial, industrial and tourism based businesses and employment</li> </ul>   | No Impact   | No Impact   | No impacts.<br><br>C1 and C2 produce no impact to commercial/industrial.   |
| <b>5 CULTURAL ENVIRONMENT</b><br><br>5.1 Archaeological <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on archaeological features.</li> </ul>   |  |  | C1 and C2 both pass very close to an unregistered Iroquoian village location. C1 follows the beach ridge and impacts far more land within 200 m of water than C2.<br><br>C1 produces a high impact. C2 produces a low impact.                                    |
| 5.2 Historical <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on heritage features.</li> </ul>  |  |  | Both routes displace the same number of cultural landscape units, but C2 displaces fewer farm complexes.<br><br>Both alternatives produce a moderate impact but C2 produces slightly lower displacement effects.   |

#### SUMMARY OF TRADE-OFFS

C2 was considered to have lower overall impacts due primarily to lower impacts to fisheries and aquatic habitat, and vegetation.

**THEREFORE, C2 IS PREFERRED**



First Preference



Second Preference











## EVALUATION OF ROUTE ALTERNATIVES - TRADE-OFF METHOD

### PREFERRED C (C1 VS C2)







| FACTOR/Criteria   | D2A/E1  | D2D/E1  | COMMENT   |
|---|---|---|---|
| <b>1. TRANSPORTATION</b>  |   |   |   |
| <b>1.1 Traffic Operations</b> <ul style="list-style-type: none"> <li>Examines how well each alternative will allow traffic to move through the study area.</li> </ul>   |    |    | <p>D2D/E1 serves more vehicles than D2A/E1 due to the additional interchange with Highway 48 near Pepperlaw.</p> <p><b>D2D/E1 has a moderate benefit to traffic operations and D2A/E1 has a low benefit.</b></p>  |
| <b>1.2 Network Compatibility</b> <ul style="list-style-type: none"> <li>Examines how compatible each alternative is with the existing road network and the ability to upgrade each alternative to meet future needs.</li> </ul> |    |    | <p>D2D serves the future growth areas around Pepperlaw, which provides minor relief to the Highway 48 corridor west of Pepperlaw. D2A provides no such benefit to the road network. Although this benefit is realized outside the area directly served by the two routes, it represents a notable difference between these two routes. D2D has a slightly higher benefit to volumes on parallel/crossing roads.</p> <p>Similarly, for traffic operations, both route alternatives generate a moderate benefit to the road network by reducing the volumes, thereby improving operations on crossing/parallel routes. D2D improves operations in the Highway 48 corridor west of Pepperlaw by diverting some traffic away from this corridor. D2D has a slightly higher benefit to operations of parallel/crossing roads.</p> <p><b>Both routes have a moderate benefit to network compatibility, with D2D/E1 having slightly higher benefits.</b></p> |
| <b>1.3 Cost</b> <ul style="list-style-type: none"> <li>Examines the short- and long-term cost of each roadway alternative.</li> </ul>   | SAME  | SAME  | <p>No significant differences in costs.</p> <p><b>Both routes have a low cost impact.</b></p>   |
| <b>2. NATURAL ENVIRONMENT</b>   |   |   |   |
| <b>2.1 Fisheries and Aquatic Habitat</b> <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on water quantity, quality, fish species and aquatic habitat.</li> </ul>                         | SAME  | SAME  | <p>Both routes cross potential critical habitat (brook trout spawning) and impact known critical habitat (walleye spawning). Route D2D/E1 also impacts streams with sensitive (sculpin) and significant (bass) communities.</p> <p><b>Both routes have severe impacts to fisheries.</b></p>   |
| <b>2.2 Wildlife</b> <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on wildlife species and habitat.</li> </ul>   |   |   | <p>D2A/E1 crosses regional wildlife corridors, has a greater bird species diversity as well as potential to displace a regionally rare bird.</p> <p><b>D2A/E1 produces high impacts while D2D/E1 produces moderate impacts.</b></p>   |
| <b>2.3 Wetlands</b> <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on wetland resources.</li> </ul>  | SAME  | SAME  | <p>Impacts are very similar on both routes. Although D2D/E1 affects slightly more wetlands, the vegetation being removed in the D2A/E1 route is more sensitive.</p> <p><b>Both routes produce moderate impacts to wetlands.</b></p>   |
| <b>2.4 Vegetation</b> <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on vegetation units and individual specimens.</li> </ul>  |  |  | <p>Both routes have similar effects, however D2D/E1 crosses more small forests and removes a larger area of Regional Forest.</p> <p><b>Both routes produce moderate impacts to vegetation, with D2D/E1 producing slightly higher impacts.</b></p>   |
| <b>2.5 Ground Water</b> <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on commercial and domestic water supply.</li> </ul>   |  |  | <p>Both routes cross relatively large areas of highly permeable soil and high ground water table. D2A/E1 has slightly lower impacts to groundwater.</p> <p><b>Both routes have high impacts to groundwater, with D2D/E1 producing slightly higher impacts.</b></p>  |
| <b>2.6 Geology</b> <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on significant landforms.</li> </ul>   | No Impact   | No Impact   | <p>No Impact.</p> <p><b>No Impact.</b></p>  |















First Preference



Second Preference

## EVALUATION OF ROUTE ALTERNATIVES - TRADE-OFF METHOD

### PREFERRED D/E CONNECTION WITH C

| FACTOR/Criteria  | D2A/E1  | D2D/E1  | COMMENT   |
|--|---|---|---|
| <b>3 SOCIAL ENVIRONMENT</b>  |   |   |   |
| <b>3.1 Community Effects</b> <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on communities, neighbourhoods, individuals, and related land uses (residential, institutional, recreational).</li> </ul> |    |    | <p>D2A/E1 results in higher impacts than D2D/E1, particularly community cohesion and community character impacts. Both alternatives produce a high impact to community mobility.</p> <p><b>D2A/E1 has high community effects and D2D/E1 has moderate community effects.</b></p> |
| <b>3.2 Aesthetics</b> <ul style="list-style-type: none"> <li>Examines the visual impacts of each alternative.</li> </ul>   | SAME  | SAME  | <p>Both alternatives produce similar impacts.</p> <p><b>Both alternatives have moderate aesthetic impacts.</b></p>  |
| <b>3.3 Noise</b> <ul style="list-style-type: none"> <li>Examines the noise impact each alternative will have on adjacent receivers.</li> </ul>   |    |    | <p>Both alternatives result in similar impacts, but D2D/E1 results in slightly higher impacts.</p> <p><b>Both routes generate moderate noise impacts, with D2D/E1 having slightly higher impacts.</b></p>   |
| <b>4 ECONOMIC ENVIRONMENT</b>  |   |   |   |
| <b>4.1 Agricultural</b> <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on farming operations and employment.</li> </ul>   |    |    | <p>D2A/E1 produces slightly higher farm operation impacts than D2D/E1. Both routes produce comparable impacts to soil capability and linked farming operations.</p> <p><b>Both routes produce high impacts to agriculture, but D2D/E1 produces slightly lower impacts.</b></p>  |
| <b>4.2 Commercial/Industrial</b> <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on commercial, industrial and tourism based businesses and employment.</li> </ul>                                     |    |    | <p>D2D/E1 results in the displacement of two businesses.</p> <p><b>D2D/E1 results in low impacts while the D2A/E1 results in no impacts.</b></p>  |
| <b>5 CULTURAL ENVIRONMENT</b>  |   |   |   |
| <b>5.1 Archaeological</b> <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on archaeological features.</li> </ul>   |  |  | <p>D2A/E1 impacts three Paleo-Indian sites. In addition, D2A/E1 has more land within 200m of water and within 500m of beach ridges than D2D/E1.</p> <p><b>D2D/E1 produces a low impact while D2A/E1 produces a high impact.</b></p>   |
| <b>5.2 Historical</b> <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on heritage features.</li> </ul>   |  |  | <p>D2D/E1 has lower displacement and disruption impacts than D2A/E1.</p> <p><b>Both routes produce a moderate impact to heritage features, but D2D/E1 has slightly lower impacts.</b></p>   |

### SUMMARY OF TRADE-OFFS

Both alternatives generate similar impacts and transportation benefits. D2D/E1 produces higher transportation benefits, lower community and cultural environment impacts and slightly lower economic impacts than D2A/E1. These advantages outweigh the slightly higher impacts to the natural environment associated with this alternative.

**THEREFORE, D2D/E1 IS PREFERRED**



First Preference



Second Preference

## EVALUATION OF ROUTE ALTERNATIVES - TRADE-OFF METHOD

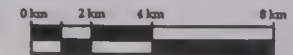
### PREFERRED D/E CONNECTION WITH C



B1B vs B1A

# LEGEND

STUDY AREA LIMIT

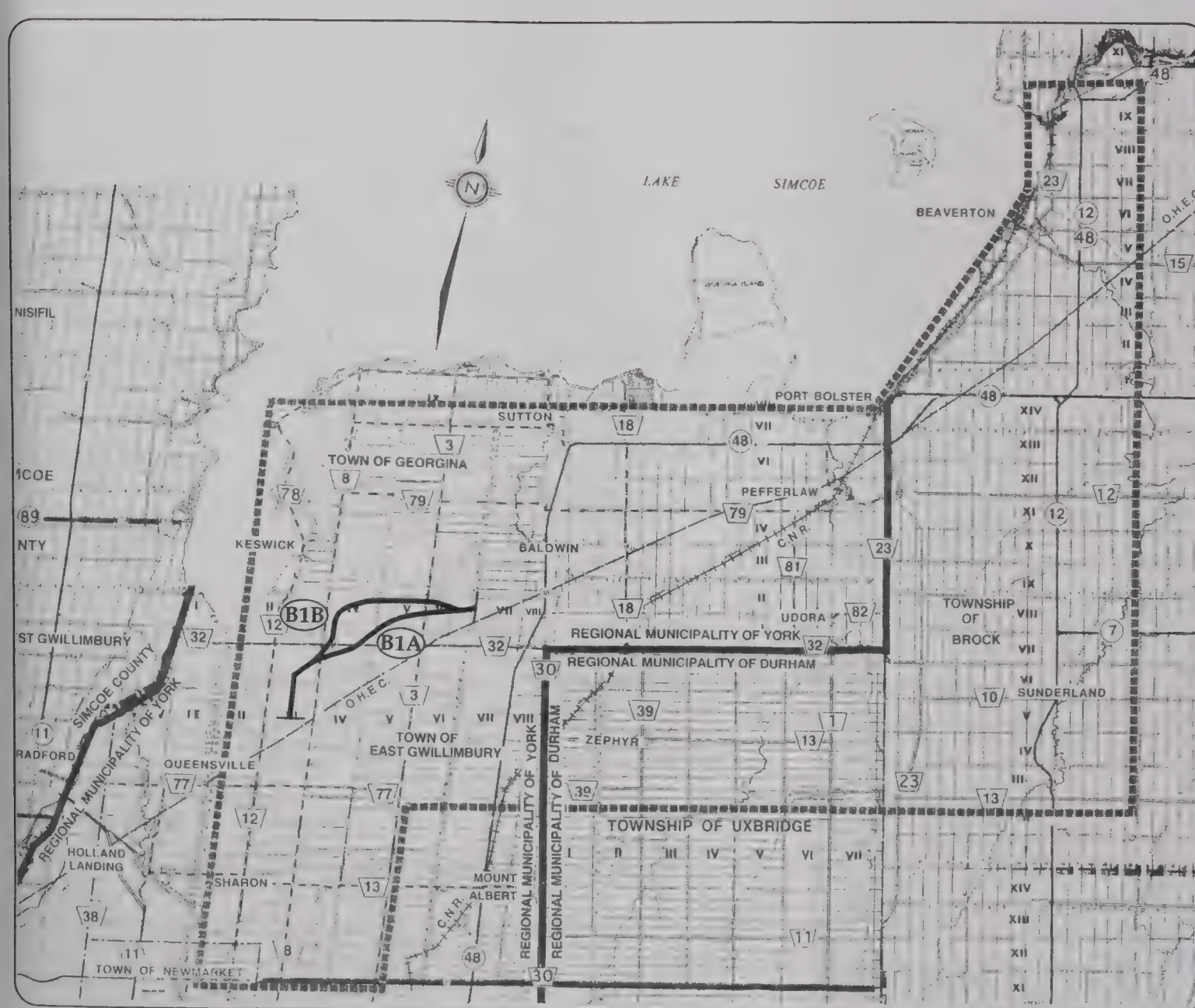


## HIGHWAY 404 EXTENSION













Davis Drive to Highway 12  
Route Planning Study and  
Environmental Assessment

 **Ontario**  
Ministry of Transportation

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4.18s





| FACTOR/Criteria   | B1A   | B1B   | COMMENT   |
|---|---|---|---|
| <b>1. TRANSPORTATION</b>  |   |   |   |
| <b>1.1 Traffic Operations</b> <ul style="list-style-type: none"> <li>Examines how well each alternative will allow traffic to move through the study area.</li> </ul>   | SAME  | SAME  | <p>The routes provide similar benefits to traffic operations.</p> <p><b>Both routes provide a moderate benefit to traffic operations.</b></p>   |
| <b>1.2 Network Compatibility</b> <ul style="list-style-type: none"> <li>Examines how compatible each alternative is with the existing road network and the ability to upgrade each alternative to meet future needs.</li> </ul> | SAME  | SAME  | <p>Effect on traffic volumes and operations on parallel/crossing roads and staging ability cannot be appropriately assessed for these minor route segments. On the remaining indicators, no significant differences were found between the two routes.</p> <p><b>Both routes provide a moderate benefit to network compatibility.</b></p> |
| <b>1.3 Cost</b> <ul style="list-style-type: none"> <li>Examines the short- and long-term cost of each roadway alternative.</li> </ul>   |    |    | <p>B1B has higher costs than B1A because B1B requires additional structures over wetlands.</p> <p><b>B1A has a low cost impact and B1B has a moderate cost impact.</b></p>  |
| <b>2. NATURAL ENVIRONMENT</b>   |   |   |   |
| <b>2.1 Fisheries and Aquatic Habitat</b> <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on water quantity, quality, fish species and aquatic habitat.</li> </ul>                         |    |    | <p>B1B passes through potential critical habitat (pike spawning). B1B also has more encroachments that affect considerable lengths of flowing streams.</p> <p><b>B1B produces moderate impacts on fisheries and aquatic habitat while B1A produces low impacts</b></p>  |
| <b>2.2 Wildlife</b> <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on wildlife species and habitat.</li> </ul>   |    |    | <p>B1A crosses 2 local corridors, 2 types of large habitat (forest and swamp) and comes within 1 km of a Great Blue Heronry. B1B displaces a rare species that tolerates edge habitats.</p> <p><b>B1A produces moderate impacts on wildlife. B1B produces low impacts on wildlife.</b></p>  |
| <b>2.3 Wetlands</b> <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on wetland resources.</li> </ul>  |  |  | <p>Larger wetland encroachments and loss occur on B1B but they are in less sensitive habitats than B1A.</p> <p><b>Both alternatives produce low impacts, although the impact is marginally larger on B1A.</b></p>   |
| <b>2.4 Vegetation</b> <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on vegetation units and individual specimens.</li> </ul>  |  |  | <p>B1A crosses larger forested areas including old growth forest and higher quality beech-maple forest that is rare in the landscape.</p> <p><b>B1A produces high impact to the vegetation while B1B produces low impact.</b></p>   |
| <b>2.5 Ground Water</b> <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on commercial and domestic water supply.</li> </ul>   |  |  | <p>B1B crosses larger areas of highly permeable soil and areas sensitive to the potential release of contaminants. B1A also crosses slightly larger area of high ground water table.</p> <p><b>Both routes produce a moderate impact although B1A is slightly better as it crosses less sensitive areas.</b></p>                          |
| <b>2.6 Geology</b> <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on significant landforms.</li> </ul>   | SAME  | SAME  | <p>No Earth Science ANSI's in vicinity of alignment</p> <p><b>Neither alternative produces an impact.</b></p>   |



First Preference













Second Preference

## EVALUATION OF ROUTE ALTERNATIVES - TRADE-OFF METHOD

### PREFERRED B1 (B1A vs. B1B)



| FACTOR/Criteria   | B1A   | B1B   | COMMENT   |
|---|---|---|---|
| <b>3 SOCIAL ENVIRONMENT</b>   |   |   |   |
| 3.1 Community Effects <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on communities, neighbourhoods, individuals, and related land uses (residential, institutional, recreational).</li> </ul> |    |    | B1B displaces and disrupts slightly more residences than B1A but B1A has a higher impact on community stability. The higher effects on community stability outweigh the slightly higher residential impacts. Therefore, B1B is preferred.<br><br><b>Both alternatives produce a low impact on community effects, but B1B produces slightly lower impacts.</b> |
| 3.2 Aesthetics <ul style="list-style-type: none"> <li>Examines the visual impacts of each alternative.</li> </ul>   |    |    | B1A visually impacts more residents<br><b>Both alternatives produce a moderate impact to aesthetics, but B1B produces slightly lower impacts.</b>   |
| 3.3 Noise <ul style="list-style-type: none"> <li>Examines the noise impact each alternative will have on adjacent receivers.</li> </ul>   | SAME  | SAME  | The routes generate similar noise impacts.<br><br><b>Both routes have moderate noise impacts.</b>   |
| <b>4 ECONOMIC ENVIRONMENT</b>   |   |   |   |
| 4.1 Agricultural <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on farming operations and employment.</li> </ul>   |    |    | B1A produces slightly higher farm operation impacts and soil capability impacts than B1B. Both routes produce comparable minor impacts to linked farming operations.<br><br><b>Both routes produce moderate impacts to agriculture, but route B1B produces slightly lower impacts.</b>  |
| 4.2 Commercial/Industrial <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on commercial, industrial and tourism based businesses and employment.</li> </ul>                                     | SAME  | SAME  | Both alternatives affect the same business which results in a minor impact.<br><br><b>Both alternatives result in low impacts.</b>  |
| <b>5 CULTURAL ENVIRONMENT</b>   |   |   |   |
| 5.1 Archaeological <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on archaeological features.</li> </ul>   |  |  | B1A impacts far less land within 200m of water or within 500m of a beach ridge than B1B. Neither route directly impacts a registered site.<br><br><b>B1A produces a low impact. B1B produces a moderate impact.</b>   |
| 5.2 Historical <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on heritage features.</li> </ul>   |  |  | Route B1A has lower displacement impacts and similar disruption impacts than B1B.<br><b>Both routes produce a moderate impact to heritage features, but B1A has slightly lower impacts.</b>   |

### SUMMARY OF TRADE-OFFS

The routes have similar impacts and transportation benefits. B1B has lower or slightly lower impacts to the community, wetlands, vegetation and agriculture. These criteria are of greater importance to the study area than fisheries, groundwater cost and the cultural environment criteria, for which B1A has lower or slightly lower impacts.

**THEREFORE, B1B IS PREFERRED**



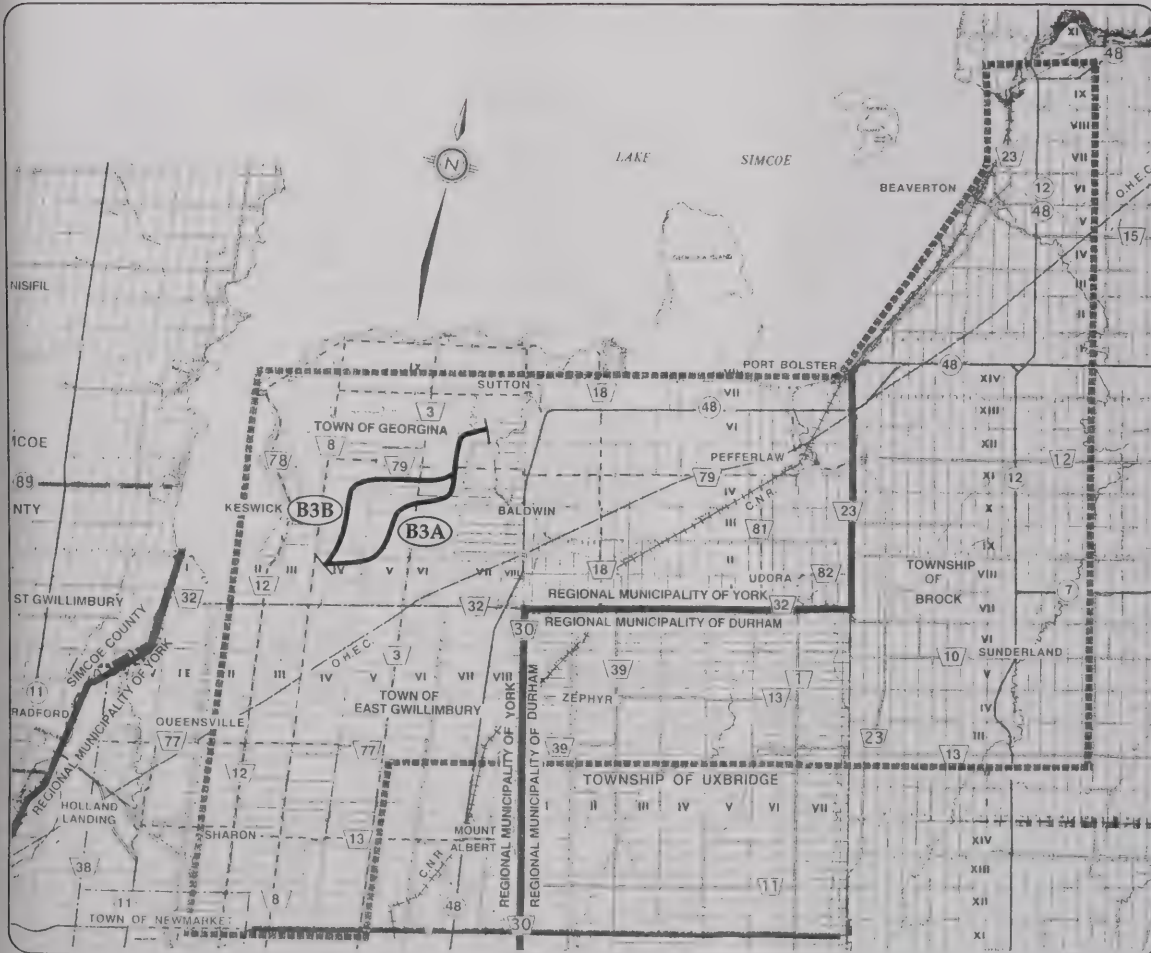
First Preference



Second Preference

## EVALUATION OF ROUTE ALTERNATIVES - TRADE-OFF METHOD

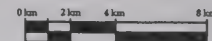
### PREFERRED B1 (B1A vs. B1B)



B3A vs B3B

## LEGEND

STUDY AREA LIMIT



## HIGHWAY 404 EXTENSION

Davis Drive to Highway 12

Route Planning Study and  
Environmental Assessment















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| FACTOR/Criteria   | B3A   | B3B   | COMMENT   |
|---|---|---|---|
| <b>1. TRANSPORTATION</b>  |   |   |   |
| <b>1.1 Traffic Operations</b> <ul style="list-style-type: none"> <li>Examines how well each alternative will allow traffic to move through the study area.</li> </ul>   |    |    | Route B3B serves a significantly higher design hour volume than B3A.<br><br><b>B3B has high traffic operations benefits and B3A has low benefits.</b>   |
| <b>1.2 Network Compatibility</b> <ul style="list-style-type: none"> <li>Examines how compatible each alternative is with the existing road network and the ability to upgrade each alternative to meet future needs.</li> </ul> |    |    | B3B creates a greater benefit to traffic volumes and operations on Woodbine Avenue, while route B3A creates a greater benefit to traffic volumes on Kennedy Road, which is not as significant to the roadway network. Staging abilities cannot be appropriately assessed for these minor route segments.<br><br><b>B3B produces high benefits to Network Compatibility and B3A produces moderate benefits to Network Compatibility.</b> |
| <b>1.3 Cost</b> <ul style="list-style-type: none"> <li>Examines the short- and long-term cost of each roadway alternative.</li> </ul>   |    |    | B3B has slightly higher costs than B3A due to greater route length and additional structures required.<br><br><b>Both routes have low cost impacts, with B3A having slightly lower impacts.</b>   |
| <b>2. NATURAL ENVIRONMENT</b>   |   |   |   |
| <b>2.1 Fisheries and Aquatic Habitat</b> <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on water quantity, quality, fish species and aquatic habitat.</li> </ul>                         | <b>SAME</b>   | <b>SAME</b>   | Critical habitat (pike spawning) downstream of a crossing may be affected by B3B and possibly B3A. Both routes also cross one permanently flowing stream.<br><br><b>Both routes have a moderate impact on fisheries and aquatic habitat.</b>  |
| <b>2.2 Wildlife</b> <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on wildlife species and habitat.</li> </ul>   |    |    | B3A crosses more local wildlife corridors than B3B. Both routes have a similar low potential to affect foraging of Great Blue Herons from local heronry.<br><b>B3A and B3B both produce a low impact to wildlife, however, the wildlife corridors crossed by B3A produces a greater impact.</b>   |
| <b>2.3 Wetlands</b> <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on wetland resources.</li> </ul>  |  |  | B3A has more short wetland crossings, one of which passes through standing water and forest, and displaces more area than B3B. Wetlands crossed by B3A have slightly higher ground water interaction than that crossed by B3B.<br><br><b>B3B produces a low impact to wetlands. B3A produces a moderate impact to wetlands.</b>   |
| <b>2.4 Vegetation</b> <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on vegetation units and individual specimens.</li> </ul>  |  |  | B3A has a greater number of forest crossings and displaces a slightly larger area of forest than B3B. In addition B3A crosses forested riparian habitat associated with a 1st/2nd order stream.<br><br><b>Both alternative produce a low impact to vegetation but B3B produces slightly lower impacts.</b>  |
| <b>2.5 Ground Water</b> <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on commercial and domestic water supply.</li> </ul>   |  |  | Both alternatives cross large areas of highly permeable soils, areas of high ground water table and areas sensitive to ground water contamination.<br><br><b>Both alternative produce a moderate impacts to groundwater but B3B produces slightly lower impacts.</b>  |
| <b>2.6 Geology</b> <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on significant landforms.</li> </ul>   | <b>No Impact</b>  | <b>No Impact</b>  | Neither alternative produces an impact.<br><br><b>Neither alternative produces an impact.</b>   |















First Preference



Second Preference

## EVALUATION OF ROUTE ALTERNATIVES - TRADE-OFF METHOD


### PREFERRED B3 (B3A vs. B3B)

| FACTOR/Criteria  | B3A   | B3B   | COMMENT   |
|--|---|---|---|
| <b>3 SOCIAL ENVIRONMENT</b><br><br>3.1 Community Effects <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on communities, neighbourhoods, individuals, and related land uses (residential, institutional, recreational).</li> </ul> |    |    | B3A displaces more residences and has a higher potential effect on community stability. B3B disrupts more residences.<br><br>B3B produces moderate impacts on community effects. B3A produces high impacts on community effects.                      |
| 3.2 Aesthetics <ul style="list-style-type: none"> <li>Examines the visual impacts of each alternative.</li> </ul>  |    |    | B3A visually impacts more residences.<br><br>B3B produces low impacts on aesthetics. B3A produces moderate impacts on aesthetics.   |
| 3.3 Noise <ul style="list-style-type: none"> <li>Examines the noise impact each alternative will have on adjacent receivers.</li> </ul>  |    |    | B3A impacts more than twice as many residences than B3B and most of these impacts are more severe than the impacts associated with B3B.<br><br>B3A produces a moderate impact while B3B produces a low impact.  |
| <b>4 ECONOMIC ENVIRONMENT</b><br><br>4.1 Agricultural <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on farming operations and employment.</li> </ul>   |    |    | B3A produces a slightly greater impact to the viability of existing farm operations. B3B has a slightly greater impact on soil capability.<br><br>Both alternatives produce a moderate impact to agriculture but B3B produces slightly lower impacts. |
| 4.2 Commercial/Industrial <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on commercial, industrial and tourism based businesses and employment.</li> </ul>  | No Impact   | No Impact   | Neither alternative produces an impact.<br><br>Neither alternative produces an impact.  |
| <b>5 CULTURAL ENVIRONMENT</b><br><br>5.1 Archaeological <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on archaeological features.</li> </ul>   |  |  | B3B impacts a Paleo-Indian site and impact more land within 200 m of water than B3A.<br><br>B3A produces a low impact. B3B produces a moderate impact.  |
| 5.2 Historical <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on heritage features.</li> </ul>  |  |  | B3A displaces fewer cultural landscape units than B3B.<br><br>Both alternative produce a moderate impact to historical features but B3A produces slightly lower impacts.  |

### SUMMARY OF TRADE-OFFS

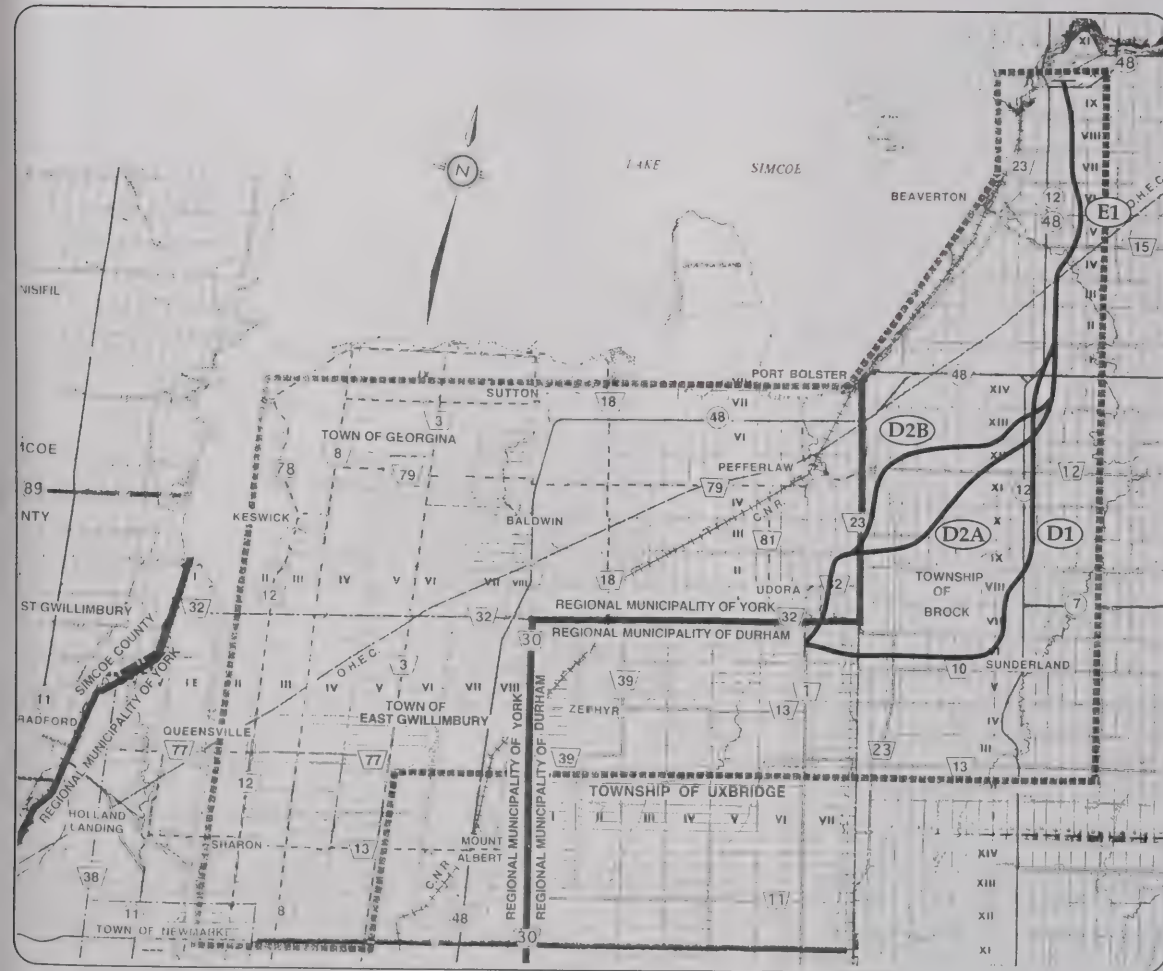
B3B is preferred in all criteria except for archaeological and historical. Although B3A produces slightly lower historical impacts, these are outweighed by the greater benefits to transportation and lower impacts to all other criteria provided by B3B.

**THEREFORE, B3B IS PREFERRED**

 First Preference
  Second Preference

## EVALUATION OF ROUTE ALTERNATIVES - TRADE-OFF METHOD

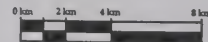
### PREFERRED B3 (B3A vs. B3B)



D1/E1 vs D2A/E1 vs D2B/E1

# LEGEND

STUDY AREA LIMIT



## HIGHWAY 404 EXTENSION
















Davis Drive to Highway 12  
Route Planning Study and  
Environmental Assessment

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| FACTOR/Criteria  | D1\E1   | D2A\E1  | D2B\E1  | COMMENT  |
|--|---|---|---|--|
| <b>1. TRANSPORTATION</b><br><br>1.1 Traffic Operations<br>• Examines how well each alternative will allow traffic to move through the study area.  | SAME  | SAME  | SAME  | All the routes provide the same benefit to traffic operations.<br><br>The routes provide the same moderate benefit to traffic operations.  |
| 1.2 Network Compatibility<br>• Examines how compatible each alternative is with the existing road network and the ability to upgrade each alternative to meet future needs.              | SAME  | SAME  | SAME  | D1/E1 has a better staging ability because it can provide an additional interim terminus at a provincial highway (Highway 7). Overall, the routes have the same benefits to network compatibility.<br><br>All routes provide a moderate benefit to traffic operations.   |
| 1.3 Cost<br>• Examines the short- and long-term cost of each roadway alternative.  | SAME  | SAME  | SAME  | D1/E1 has a slightly higher operating cost because it is longer than the other two alternatives. Overall, the routes have the same cost impacts.<br><br>All routes have a low cost impact.   |
| <b>2. NATURAL ENVIRONMENT</b><br><br>2.1 Fisheries and Aquatic Habitat<br>• Examines the impact each alternative will have on water quantity, quality, fish species and aquatic habitat. |    |    |    | D2A/E1 and D2B/E1 have similar impacts to cold water habitat and potential critical habitat (brook trout spawning). D2B/E1 has slightly greater impacts to sensitive (sculpin) and significant (bass) communities since it is a crossing while D2A/E1 is a distant crossing. D1/E1 does not have an impact. All three routes have a similar impact to critical habitat in the Beaverton River (walleye spawning).<br><br>Route D2A/E1 and D2B/E1 produce high impacts to fisheries with D2B/E1 being slightly worse, while D1/E1 produces moderate impacts.  |
| 2.2 Wildlife<br>• Examines the impact each alternative will have wildlife species and habitat.   |    |    |    | D1/E1 severs wildlife corridors and passes within 1 km of heronry. Impacts on D2A/E1 and D2B/E1 are similar, but D2B/E1 removes a greater area of habitat<br><br>D1/E1 produces high impacts to wildlife while D2A/E1 and D2B/E1 produces similar moderate impacts with the latter slightly higher   |
| 2.3 Wetlands<br>• Examines the impact each alternative will have on wetland resources.   |   |   |   | D1/E1 has highest loss of wetland, and produces high impact to wetland function. D2B/E1 crosses less wetland, but produces the longest area of wetland encroachments, including on the fen in Gibson Hill Swamp. This will result in an increased need for careful study of the hydrogeology to ensure the ground water supply to the fen, and greater diligence in terms of mitigation in order to avoid impacts to this unique wetland. D2A/E1 crosses less wetland, with the least encroachment.<br>D1/E1 produces the highest impact to wetlands, and D2B/E1, although of lesser impact is scored high due to its proximity to the fen. D2A/E1 produces a moderate impact. |
| 2.4 Vegetation<br>• Examines the impact each alternative will have on vegetation units and individual specimens.   |  |  |  | D1/E1 removes large areas of forest, which includes areas of ESA and regional forest, many forests of large sizes, combined with a large number of habitat types. D2B/E1 produces slightly reduced high impacts, missing the ESA. D2A/E1 produces moderate impacts affecting less forest in general, and no loss of regional forest.<br>D1/E1 produces the highest impacts with D2B/E1 high but slightly less. D2A/E1 produces low impacts.  |
| 2.5 Ground Water<br>• Examines the impact each alternative will have on commercial and domestic water supply.  |  |  |  | All three routes cross relatively large areas of highly permeable soil, areas sensitive to ground water contamination and high ground water table. D1/E1 crosses smallest sensitive areas but largest shallow ground water area and is the best overall route. D2B/E1 crosses the largest sensitive areas and has the highest impact of the three.<br><br>All three routes produce moderate impacts, with D1/E1 producing the lowest impacts and D2B/E1 the highest impacts.   |
| 2.6 Geology<br>• Examines the impact each alternative will have on significant landforms.  | No Impact   | No Impact   | No Impact   | All three routes have no Earth Science ANSI's within 300 m of the route.<br><br>No Impact.   |



First Preference


















Second Preference






Third Preference

## EVALUATION OF ROUTE ALTERNATIVES - TRADE-OFF METHOD

### PREFERRED D/E1 (D1/E1 vs. D2A/E1 vs. D2B/E1)

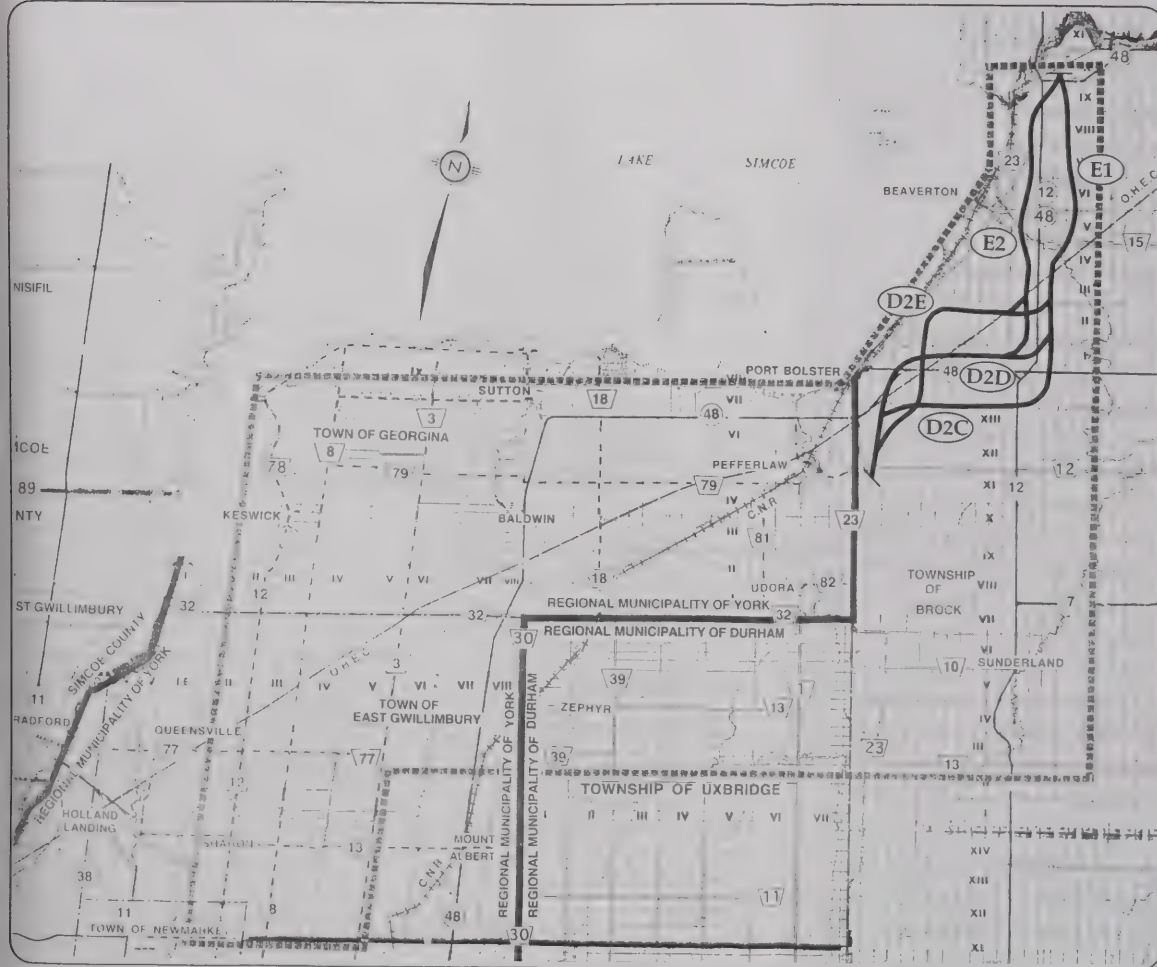
| FACTOR/Criteria  | D1\E1   | D2A\E1  | D2B\E1  | COMMENT  |
|--|---|---|---|--|
| <b>3 SOCIAL ENVIRONMENT</b><br>3.1 Community Effects <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on communities, neighbourhoods, individuals, and related land uses (residential, institutional, recreational).</li> </ul>           | SAME  | SAME  | SAME  | All alternatives produce similar physical impacts and community effects<br><br>All alternatives produce similar moderate impacts.  |
| 3.2 Aesthetics <ul style="list-style-type: none"> <li>Examines the visual impacts of each alternative.</li> </ul>  |    |    |    | All alternatives visually affect a similar number of residences.<br><br>All alternatives produce moderate impacts, but D2B\E1 produces slightly higher impacts.  |
| 3.3 Noise <ul style="list-style-type: none"> <li>Examines the noise impact each alternative will have on adjacent receivers.</li> </ul>  |    |    |    | D2A/E1 results in fewer impacts than the other alternatives. D1/E1 and D2B/E1 result in similar impacts.<br>D2A/E1 results in low noise impacts while D1/E1 and D2B/E1 results in similar moderate impacts.  |
| <b>4 ECONOMIC ENVIRONMENT</b><br>4.1 Agricultural <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on farming operations and employment.</li> </ul>   |    |    |    | D1/E1 has the highest impact with severe impacts to operational viability and soil capability. Route D2B/E1 and D2A/E1 produce approximately the same impact.<br><br>All alternatives result in high impacts, with D1/E1 having the highest impacts and D2B/E1 producing slightly lower impacts.                             |
| 4.2 Commercial/Industrial <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on commercial, industrial and tourism based businesses and employment.</li> </ul>  | No Impact   | No Impact   | No Impact   | No Impact.<br><br>No Impact  |
| <b>5 CULTURAL ENVIRONMENT</b><br>5.1 Archaeological <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on archaeological features.</li> </ul>   |  |  |  | D2A/E1 will directly impact three Paleo-Indian sites and D2B/E1 will impact four Paleo-Indian sites. D2B/E1 follows the beach ridge lines most closely. D2A/E1 has slightly less impact on lands within 200m of water.<br><br>D1/E1 produces a low impact. D2A/E1 produces a moderate impact. D2B/E1 produces a high impact. |
| 5.2 Historical <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on heritage features.</li> </ul>  |  |  |  | D2B/E1 has the least potential adverse impact with the lowest displacement effects and lowest disruption effects. D1/E1 is considered to have the greatest impacts.<br><br>All alternatives produce moderate impacts. D2B/E1 is slightly preferred.  |
| <b>SUMMARY OF TRADE-OFFS</b><br>All alternatives result in similar social, economic and cultural impacts and similar transportation benefits. D2A/E1 produces much lower natural environment impacts than all other alternatives.<br><br><b>THEREFORE, D2A/E1 IS PREFERRED</b> |   |   |   |  |

 First Preference
  Second Preference
  Third Preference

## EVALUATION OF ROUTE ALTERNATIVES - TRADE-OFF METHOD

### PREFERRED D/E1 (D1/E1 vs. D2A/E1 vs. D2B/E1)

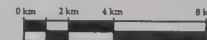




D2C/E1 vs D2D/E1 vs D2D/E2  
D2E/E1 vs D2E/E2

## LEGEND

STUDY AREA LIMIT



## HIGHWAY 404 EXTENSION

Davis Drive to Highway 12

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| FACTOR/Criteria  | D2C/E1 | D2D/E1 | D2D/E2 | D2E/E1 | D2E/E2 | COMMENT   |
|--|--------|--------|--------|--------|--------|---|
| <b>1. TRANSPORTATION</b><br>1.1 Traffic Operations<br>• Examines how well each alternative will allow traffic to move through the study area.  | 2nd    | 1st    | 1st    | 2nd    | 2nd    | The D2D alternatives have a higher D/HV due to an additional interchange with Highway 48 in the vicinity of Durham Road 23. No other significant differences were found.  |
| 1.2 Network Compatibility<br>• Examines how compatible each alternative is with the existing road network and the ability to upgrade each alternative to meet future needs.          | SAME   | SAME   | SAME   | SAME   | SAME   | D2D/E1 and D2D/E2 provide a moderate benefit to traffic operations, while D2C/E1, D2E/E1 and D2E/E2 provide a low benefit.<br><br>No significant differences to Network Compatibility were found.   |
| 1.3 Cost<br>• Examines the short- and long-term cost of each roadway alternative.  | 2nd    | 3rd    | 2nd    | 3rd    | 1st    | All alternatives provide a low benefit to network compatibility.<br><br>D2D/E1 and D2E/E1 have higher cost impacts because they require more structures over wetlands.<br><br>D2C/E1, D2D/E2 and D2E/E2 have low cost impacts, with D2E/E2 having slightly lower impacts.<br>D2D/E1 and D2E/E1 have moderate cost impacts.  |
| <b>2. NATURAL ENVIRONMENT</b><br>2.1 Fisheries and Aquatic Habitat<br>• Examines the impact each alternative will have on water quantity, quality, fish species and aquatic habitat. | 2nd    | 1st    | 3rd    | 1st    | 3rd    | All route impacts of D2D/E2 and D2E/E2 are the same (crossing of known critical habitat - walleye spawning). Total destruction of this habitat is not expected. D2C/E1 encroaches on potential cold water habitat; it also crosses 2 and 3 km upstream of critical habitat (walleye spawning). D2D/E1 and D2E/E1 share comparable impacts (2 and 3 km upstream of critical habitat - walleye spawning).<br><br>D2C/E1, D2E/E2 and D2D/E2 produce high impacts to fisheries, D2D/E1 and D2E/E1 produce moderate impacts.   |
| 2.2 Wildlife<br>• Examines the impact each alternative will have on wildlife species and habitat.  | 3rd    | 3rd    | 2nd    | 2nd    | 1st    | D2C/E1, D2D/E1 and D2D/E2 routes have higher impacts on the area's sensitive species (proximity to heronry). D2E/E1 has higher impacts to forested habitat.<br><br>D2E/E2 and D2D/E2 produce high impacts to fisheries and aquatic habitat, while D2C/E1, D2D/E1 and D2E/E1 produce moderate impacts with D2C/E1 having slightly greater impacts.   |
| 2.3 Wetlands<br>• Examines the impact each alternative will have on wetland resources.   | 5th    | 4th    | 2nd    | 3rd    | 1st    | D2C/E1 crosses standing water in the high quality Gibson Hill Swamp. The Swamp has a high interaction with ground water. D2D/E1 crosses the same wetland, but along an existing disturbance at the extreme north edge. D2D/E1 has similar wetland impacts to the latter. D2E/E1 has a small wetland impact while D2E/E2 avoids the wetland.   |
| 2.4 Vegetation<br>• Examines the impact each alternative will have on vegetation units and   | 5th    | 4th    | 3rd    | 2nd    | 1st    | D2C/E1 produces high impacts to wetlands. D2D/E2 and D2D/E1 produce moderate impacts with D2D/E1 having slightly higher impacts. D2E/E2 has no impact.<br><br>The E1 routes cross much larger areas of forest than the E2 routes. Within this forest, more locally significant species and locally significant vegetation units are encountered. Therefore, all of the E1 routes produce higher impacts than the E2 routes.<br><br>Of the E1 routes, D2C/E1 passes by the most sensitive vegetation along the route (fen) and therefore, is the most sensitive to highway construction. D2E/E1 creates a new corridor through a sequence of forested habitat and wetland habitat, while D2D/E1 runs parallel to an existing route which has already been subject to highway impacts. Therefore, the impact produced by D2D/E1 would be less than that produced by D2E/E1. The same comments apply to a comparison of D2E/E2 and D2D/E2.<br><br>D2C/E1, D2D/E1 and D2E/E1 produce moderate impacts to vegetation, with D2C/E1 producing slightly higher and D2E/E1/D2 slightly lower impacts. D2D/E2 and D2E/E2 produce low impacts, with D2D/E2 producing the lowest impacts to vegetation of the five alternatives.<br><br>D2C/E1 produces high impacts to wetlands, D2D/E2 and D2D/E1 produce moderate impacts with D2D/E1 slightly higher, D2E/E1 produces low impacts while D2E/E2 has no impact. |
| 2.5 Ground Water<br>• Examines the impact each alternative will have on commercial and domestic water supply.  | 2nd    | 2nd    | 1st    | 3rd    | 2nd    | Relatively large areas of permeable soils are crossed by the five route alternatives with D2E/E1 crossing the largest area and D2D/E2 crossing the least. D2E/E1 also crosses the largest area with high water table. D2E/E2 has the least impact as it does not cross any areas with high water table.<br><br>D2E/E1 produces high impacts to ground water, while D2C/E1, D2D/E1 and D2E/E2 produce moderate impacts. D2D/E2 produces low impacts.   |
| 2.6 Geology<br>• Examines the impact each alternative will have on significant landforms.  | SAME   | SAME   | SAME   | SAME   | SAME   | No Earth Science ANSIs in vicinity of alignment<br><br>None of the alternatives produce an impact.  |

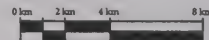


| FACTOR/Criteria   | D2C\E1 | D2D\E1 | D2D\E2 | D2E\E1 | D2E\E2 | COMMENT  |
|---|--------|--------|--------|--------|--------|--|
| <b>3 SOCIAL ENVIRONMENT</b>   |        |        |        |        |        |  |
| 3.1 Community Effects <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on communities, neighbourhoods, individuals, and related land uses (residential, institutional, recreational).</li> </ul>   | 2nd    | 1st    | 3rd    | 2nd    | 3rd    | All the alternatives linearly split Brock Township. However the alternative which connects to E2 add the impact of splitting the Beaverton area as well. Therefore, D2C/E1, D2D/E1 and D2E/E1 are preferred to D2D/E2 and D2E/E2. Of D2C/E1, D2D/E1, and D2E/E1, D2D/E1 is slightly preferred as utilizing the existing highway corridor is more consistent with the existing character of the area<br><br>D2C/E1, D2D/E1, D2E/E1 produces moderate impact to community effects but D2D/E1 produces slightly lower impacts to community effects.   |
| 3.2 Aesthetics <ul style="list-style-type: none"> <li>Examines the visual impacts of each alternative.</li> </ul>   | 1st    | 1st    | 3rd    | 2nd    | 3rd    | Alternatives which connect to E2 visually impact more residents than E2. Impacts along the D segments are similar. Therefore, D2C/E1, D2D/E1 and D2E/E1 are preferred<br><br>D2C/E1, D2D/E1, D2E/E1 produces moderate impact to aesthetics but D2C/E1 and D2D/E1 produces slightly lower impacts to aesthetics. D2D/E2 and D2E/E2 produce high impacts to aesthetics.  |
| 3.3 Noise <ul style="list-style-type: none"> <li>Examines the noise impact each alternative will have on adjacent receivers.</li> </ul>   | 2nd    | 3rd    | 1st    | 2nd    | 3rd    | The number of noise sensitive receivers experiencing an increase above existing is much lower with those alternatives which connect to E1. D2D minimizes impacts to those residences in the existing Highway 48 corridor. Therefore, D2D/E1 is preferred<br><br>D2D/E1 produces a low impact, D2C/E1 and D2E/E1 produce moderate noise impacts, and D2D/E2 and D2E/E2 produce high noise impacts.  |
| <b>4 ECONOMIC ENVIRONMENT</b>   |        |        |        |        |        |  |
| 4.1 Agricultural <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on farming operations and employment.</li> </ul>   | 3rd    | 1st    | 3rd    | 2nd    | 3rd    | All routes produce high impacts to agricultural viability, but Routes D2D/E1 and D2D/E2 produce slightly lower impacts than the other routes. The E2 routes produce high impacts to soil capability while the E1 routes produce moderate impacts. The routes generally produce moderate impacts to linked farming operations, except the D2D routes, which produce low impacts.<br><br>Routes D2D/E1 and D2E/E1 produce moderate impacts to agriculture, with Route D2D/E1 producing slightly lower impacts than the other routes. The other routes produce high impacts to agriculture. |
| 4.2 Commercial/Industrial <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on commercial, industrial and tourism based businesses and employment.</li> </ul>   | 1st    | 2nd    | 2nd    | 1st    | 1st    | D2D/E1 and D2D/E2 result in the displacement of two businesses.<br><br>D2D/E1 and D2D/E2 result in low impacts while the other alternatives result in no impacts.  |
| <b>5 CULTURAL ENVIRONMENT</b>   |        |        |        |        |        |  |
| 5.1 Archaeological <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on archaeological features.</li> </ul>   | 2nd    | 1st    | 1st    | 1st    | 1st    | D2C/E1 has one more crossing of major drainage than other routes.<br><br>D2C/E1 produces moderate impacts while all other alternatives produce similar low impacts.  |
| 5.2 Historical <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on heritage features.</li> </ul>   | 4th    | 1st    | 2nd    | 5th    | 3rd    | D2D/E1 displaces least number of cultural landscape units and disrupts low number of cultural landscape units.<br><br>All alternatives have moderate impacts with D2D/E1 having the overall lowest impacts.  |
| <b>SUMMARY OF TRADE-OFFS</b><br>Alternatives that connect to E1 were preferred to E2 because the lower social environment impacts more than offset the lower social environment impacts more than offset the lower agricultural and social environment impacts more than offset the natural environment impacts much lower overall effects. D2D/E1 was preferred over D2E/E1 because the lower agricultural and social environment impacts more than offset the natural environment impacts |        |        |        |        |        |  |
| <b>THEREFORE, D2D\E1 IS PREFERRED</b>   |        |        |        |        |        |  |

B1B vs B1C

# LEGEND

STUDY AREA LIMIT



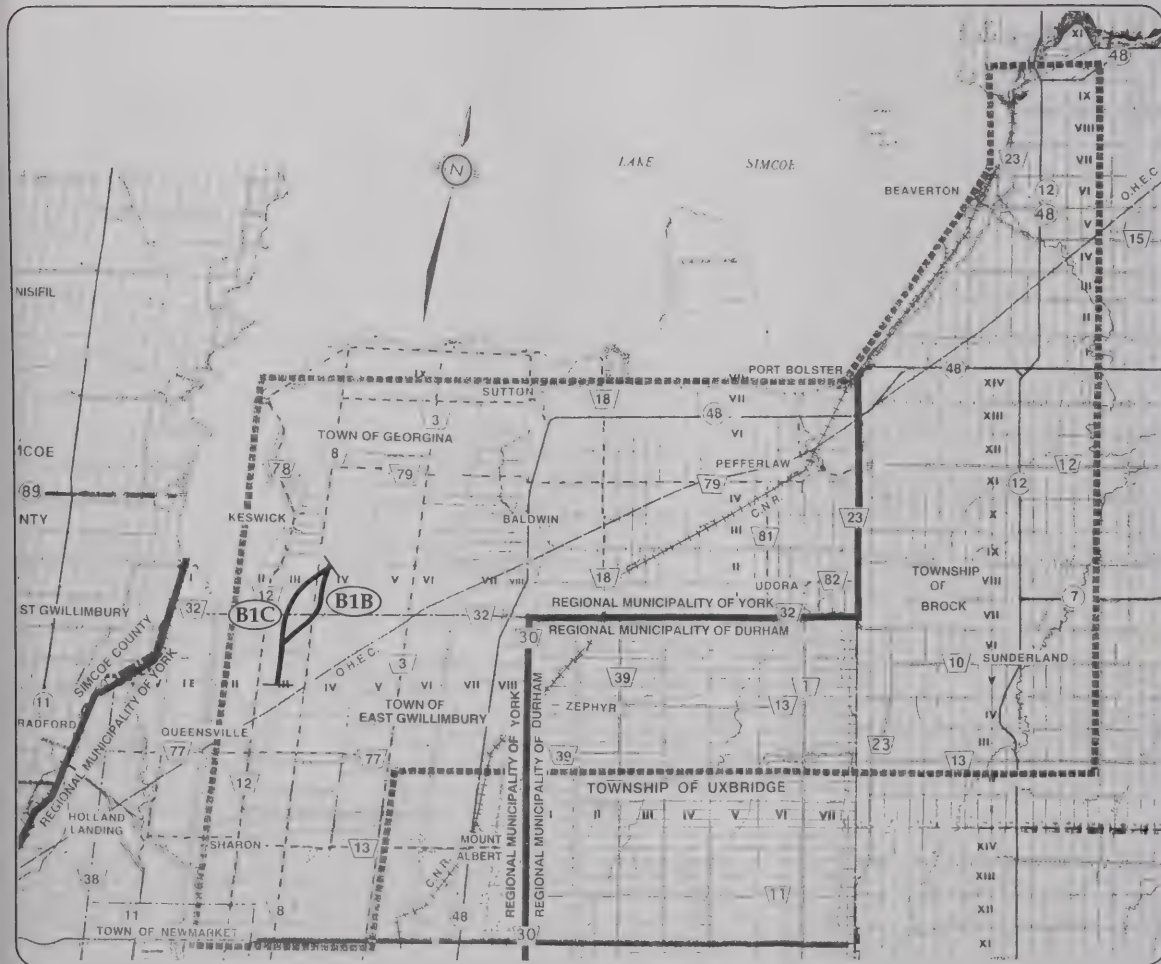
## HIGHWAY 404 EXTENSION

Davis Drive to Highway 12  
Route Planning Study and  
Environmental Assessment

 **Ontario**  
Ministry of Transportation







EXHIBIT

4.18AE







| FACTOR/Criteria  | B1B   | B1C   | COMMENT  |
|--|---|---|--|
| <b>1. TRANSPORTATION</b>   |   |   |  |
| 1.1 Traffic Operations <ul style="list-style-type: none"> <li>Examines how well each alternative will allow traffic to move through the study area.</li> </ul>   | SAME  | SAME  | B1B and B1C produce similar benefits to traffic operations.<br><br><b>Both produce a moderate benefit to traffic operations.</b>   |
| 1.2 Network Compatibility <ul style="list-style-type: none"> <li>Examines how compatible each alternative is with the existing road network and the ability to upgrade each alternative to meet future needs.</li> </ul> | SAME  | SAME  | Effect on traffic volumes and operations on parallel/crossing roads and staging ability cannot be appropriately assessed for these minor route segments. On the remaining indicators, no significant differences were found between the two routes.<br><br><b>Both routes provide a low benefit to traffic operations.</b> |
| 1.3 Cost <ul style="list-style-type: none"> <li>Examines the short- and long-term cost of each roadway alternative.</li> </ul>   |    |    | B1B has an additional grade separation (at Ravenshoe Road), resulting in higher construction and maintenance costs.<br><br><b>Both routes have low cost impacts, with B1C having slightly lower cost impacts.</b>  |
| <b>2. NATURAL ENVIRONMENT</b>  |   |   |  |
| 2.1 Fisheries and Aquatic Habitat <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on water quantity, quality, fish species and aquatic habitat.</li> </ul>                         | SAME  | SAME  | No permanently flowing watercourses crossed by either segment. Several non-permanently flowing watercourses crossed and encroached by both routes. No sensitive or significant fish communities encountered.<br><br><b>Both alternatives produce a low impact on fisheries and aquatic habitat.</b>                        |
| 2.2 Wildlife <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on wildlife species and habitat.</li> </ul>   | SAME  | SAME  | A small loss of wildlife habitat occurs on the common segment.<br><br><b>Both alternatives produce low impacts</b>   |
| 2.3 Wetlands <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on wetland resources.</li> </ul>  |  |  | B1C does not have any effects upon wetlands. B1B encroaches upon a wetland which may affect wetland function, particularly wetland/ground water interaction.<br><br><b>B1C does not affect wetlands, while B1B produces a low effect.</b>  |
| 2.4 Vegetation <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on vegetation units and individual specimens.</li> </ul>  | SAME  | SAME  | Both alternative impact a small woodlot with a fringe impact on the common section.<br><br><b>Both alternatives produce low impacts</b>  |
| 2.5 Ground Water <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on commercial and domestic water supply.</li> </ul>   |  |  | Relatively small areas of highly permeable soil affected on B1B and B1C. No areas of high ground water table crossed by B1C. No permits to take water are affected.<br><br><b>Both alternatives have virtually no impact to ground water, but B1B has slightly more impact than B1C.</b>                                   |
| 2.6 Geology <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on significant landforms.</li> </ul>   | No Impact   | No Impact   | No Earth Science ANSI's in vicinity of alignment.<br><br><b>Neither alternative produces an impact.</b>  |















First Preference



Second Preference

## EVALUATION OF ROUTE ALTERNATIVES - TRADE-OFF METHOD B1B vs. B1C

| FACTOR/Criteria  | B1B   | B1C   | COMMENT   |
|--|---|---|---|
| <b>3 SOCIAL ENVIRONMENT</b><br>3.1 Community Effects <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on communities, neighbourhoods, individuals, and related land uses (residential, institutional, recreational).</li> </ul> |    |    | B1C is located with the boundaries of the Keswick Secondary Plan. The location of this alternative severs the major growth area of Keswick and has a high impact to future development.<br><br><b>B1B produces a low impact to community effects and B1C produces a high impact to community effects.</b> |
| 3.2 Aesthetics <ul style="list-style-type: none"> <li>Examines the visual impacts of each alternative.</li> </ul>  |    |    | Both alternatives are in close proximity to an urban area with existing major roads, however B1B visually impacts slightly more farmstead residences.<br><br><b>Both alternatives produce a low impact to aesthetics, however B1C produces slightly lower impacts.</b>                                    |
| 3.3 Noise <ul style="list-style-type: none"> <li>Examines the noise impact each alternative will have on adjacent receivers.</li> </ul>  | SAME  | SAME  | Both alternatives produce similar impacts.<br><br><b>Both alternatives produce a low impact to noise.</b>   |
| <b>4 ECONOMIC ENVIRONMENT</b><br>4.1 Agricultural <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on farming operations and employment.</li> </ul>   |    |    | B1B has slightly higher impact to operational viability of agricultural operations and linked farming operations. Both routes have minor impacts to soil capability.<br><br><b>Both alternatives produce low agricultural impacts, but B1C produces slightly lower impacts.</b>                           |
| 4.2 Commercial/Industrial <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on commercial, industrial and tourism based businesses and employment.</li> </ul>  |   |   | B1C results in the displacement of two additional businesses.<br><br><b>B1B results in a low impact, while B1C results in a moderate impact.</b>  |
| <b>5 CULTURAL ENVIRONMENT</b><br>5.1 Archaeological <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on archaeological features.</li> </ul>   |  |  | B1C has a higher impact to registered sites.<br><br><b>B1C produces a high impact. B1B produces a low impact.</b>   |
| 5.2 Historical <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on heritage features.</li> </ul>  |  |  | B1C is considered to have the least adverse impact, having fewer cultural landscape units disrupted than B1B.<br><br><b>Both alternatives have a low impact, with B1C having slightly lower impacts.</b>  |

### SUMMARY OF TRADE-OFFS

Although B1B produces slightly higher wetland, aesthetic, agricultural and historic impacts and results in a moderately higher cost, B1B is considered to have lower overall impacts than B1C due primarily to much lower community effects.

**THEREFORE, B1B IS PREFERRED**



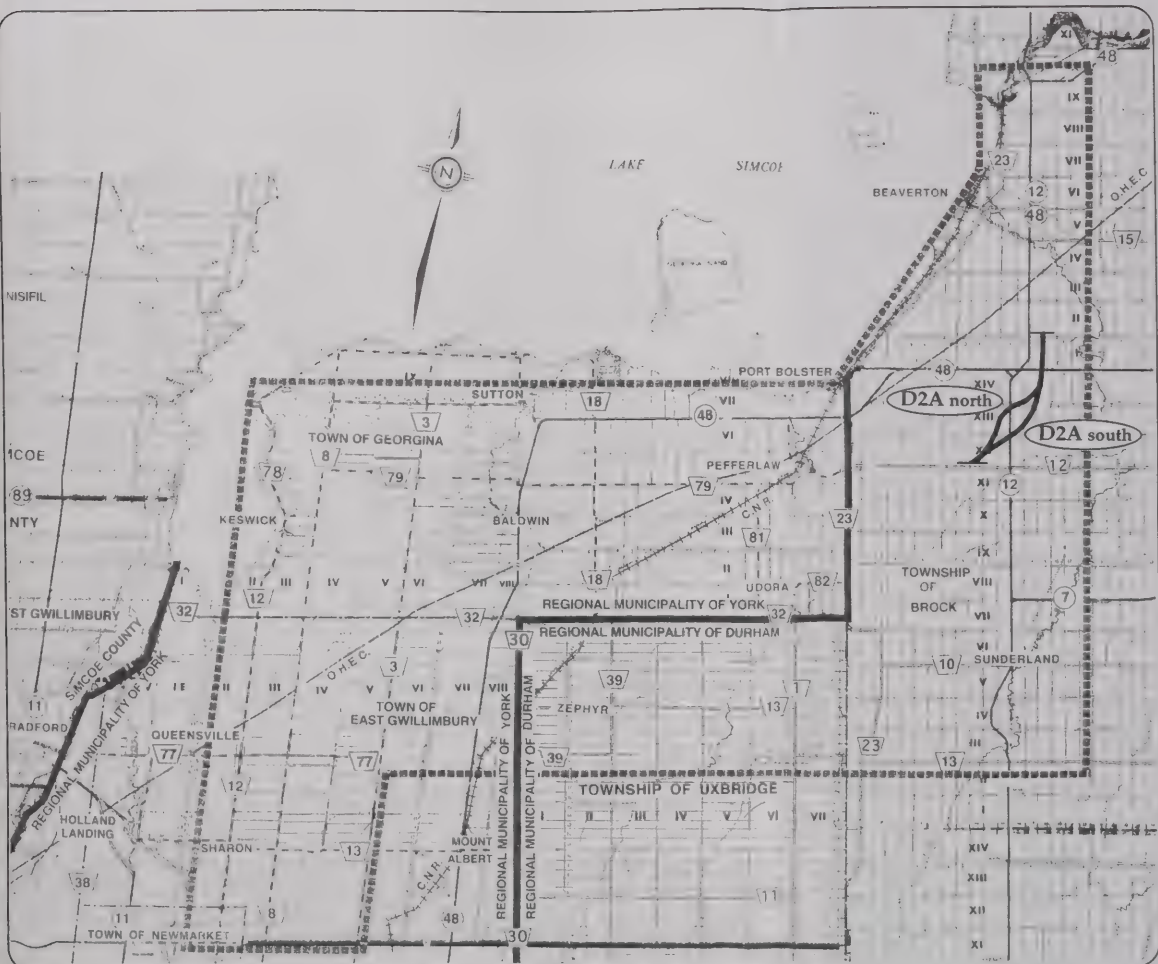
First Preference



Second Preference

## EVALUATION OF ROUTE ALTERNATIVES - TRADE-OFF METHOD

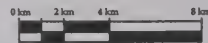
### B1B vs. B1C



# D2A NORTH vs D2A SOUTH

## LEGEND

STUDY AREA LIMIT



## HIGHWAY 404 EXTENSION













Davis Drive to Highway 12  
Route Planning Study and  
Environmental Assessment

 **Ontario**  
Ministry of Transportation

EXHIBIT  
**4.18AH**





| FACTOR/Criteria   | D2A North   | D2A South   | COMMENT   |
|---|---|---|---|
| <b>1. TRANSPORTATION</b>  |   |   |   |
| <b>1.1 Traffic Operations</b> <ul style="list-style-type: none"> <li>Examines how well each alternative will allow traffic to move through the study area.</li> </ul>   | SAME  | SAME  | <p>No significant difference in traffic operations was found between D2A North and D2A South.</p> <p><b>Both routes produce a low benefit to traffic operations.</b></p>  |
| <b>1.2 Network Compatibility</b> <ul style="list-style-type: none"> <li>Examines how compatible each alternative is with the existing road network and the ability to upgrade each alternative to meet future needs.</li> </ul> | SAME  | SAME  | <p>Effect on traffic volumes and operations on parallel/crossing roads and staging ability cannot be appropriately assessed for these minor route segments. On the remaining indicators, no significant differences were found between the two routes.</p> <p><b>Both routes produce a low benefit to network compatibility.</b></p>            |
| <b>1.3 Cost</b> <ul style="list-style-type: none"> <li>Examines the short- and long-term cost of each roadway alternative.</li> </ul>   |    |    | <p>D2A North has higher costs than D2A South, because D2A North is a longer route and has higher property costs.</p> <p><b>Both routes have low cost impacts, with D2A South having slightly lower cost impacts.</b></p>  |
| <b>2. NATURAL ENVIRONMENT</b>   |   |   |   |
| <b>2.1 Fisheries and Aquatic Habitat</b> <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on water quantity, quality, fish species and aquatic habitat.</li> </ul>                         |    |    | <p>D2A North results in a potentially greater impact to sensitive coldwater fish community (sculpin) and warm water communities with significant species (bass). Both routes cross one permanently flowing stream.</p> <p><b>D2A South produces low impacts to fisheries and aquatic habitat while D2A North produces moderate impacts.</b></p> |
| <b>2.2 Wildlife</b> <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on wildlife species and habitat.</li> </ul>   |    |    | <p>D2A South passes within 1 km of a heronry. Regionally rare species found within D2A South corridor.</p> <p><b>D2A South produces moderate impacts to wildlife while D2A North produces low impacts.</b></p>  |
| <b>2.3 Wetlands</b> <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on wetland resources.</li> </ul>  |  |  | <p>Wet swamp removed due to crossing by D2A South. D2A North does not cross a wetland, but encroaches upon a seasonally inundated swamp.</p> <p><b>D2A South produces a moderate impact on wetlands, while D2A North produces a low impact.</b></p>   |
| <b>2.4 Vegetation</b> <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on vegetation units and individual specimens.</li> </ul>  |  |  | <p>D2A South results in marginally greater forest displacement than D2A North.</p> <p><b>Both alternatives produce low impacts. B2A North produces slightly lower impacts.</b></p>  |
| <b>2.5 Ground Water</b> <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on commercial and domestic water supply.</li> </ul>   |  |  | <p>Minor areas of highly permeable soil crossed by both alternatives. D2A North covers slightly less sensitive areas. D2A South crosses minor areas of high ground water table.</p> <p><b>Both routes produce low impacts to ground water, but D2A North produces slightly lower impacts.</b></p>   |
| <b>2.6 Geology</b> <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on significant landforms.</li> </ul>   | No Impact   | No Impact   | <p>No Earth Science ANSI's in vicinity of alignment</p> <p><b>Neither alternative produces an impact.</b></p>   |















First Preference



Second Preference

## EVALUATION OF ROUTE ALTERNATIVES - TRADE-OFF METHOD

### PREFERRED D2A (D2A NORTH VS. D2A SOUTH)

| FACTOR/Criteria   | D2A North   | D2A South   | COMMENT  |
|---|---|---|--|
| <b>3 SOCIAL ENVIRONMENT</b>   |   |   |  |
| 3.1 Community Effects <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on communities, neighbourhoods, individuals, and related land uses (residential, institutional, recreational).</li> </ul> |    |    | Both alternatives are very similar in all indicators with exception of potential to displace existing residences. From this respect D2A South has the lowest impact and is therefore preferred over D2A North.<br><br><b>D2A North produces a high impact to social environment and D2A South produces a moderate social environment impact.</b> |
| 3.2 Aesthetics <ul style="list-style-type: none"> <li>Examines the visual impacts of each alternative.</li> </ul>   |    |    | Alternative D2A North produces higher aesthetic impacts.<br><br><b>D2A North produces a moderate aesthetic impacts and D2A South produces a low aesthetic impacts.</b>   |
| 3.3 Noise <ul style="list-style-type: none"> <li>Examines the noise impact each alternative will have on adjacent receivers.</li> </ul>   |    |    | Both alternatives produce similar impacts but D2A North results in slightly higher impacts.<br><b>Both alternatives produce moderate noise impacts but D2A South results in slightly lower impacts.</b>  |
| <b>4 ECONOMIC ENVIRONMENT</b>   |   |   |  |
| 4.1 Agricultural <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on farming operations and employment.</li> </ul>   |    |    | D2A North produces slightly higher impacts to agricultural operations and soil capability.<br><br><b>Both routes produce high impacts to agriculture, but Route D2A South produces slightly lower impacts.</b>   |
| 4.2 Commercial/Industrial <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on commercial, industrial and tourism based businesses and employment.</li> </ul>                                     | No Impact   | No Impact   | No impacts to commercial/industrial.<br><br><b>D2A North and D2A South produce no impact to commercial/industrial.</b>   |
| <b>5 CULTURAL ENVIRONMENT</b>   |   |   |  |
| 5.1 Archaeological <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on archaeological features</li> </ul>  |  |  | D2A South impacts less land within 500 m of beach ridges than D2A North.<br><br><b>D2A North produces moderate impacts. D2A South produces low impacts.</b>  |
| 5.2 Historical <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on heritage features.</li> </ul>   |  |  | D2A South displaces fewer cultural landscape units than D2A North.<br><br><b>Both alternatives produce moderate impacts to heritage features and D2A South produces slightly lower impacts.</b>  |

#### SUMMARY OF TRADE-OFFS

D2A South resulted in lower overall impacts because of the much lower impacts to community effects, aesthetics, and fisheries and aquatic habitat were considered more significant than the higher wildlife, wetland and vegetation impacts.

**THEREFORE, D2A South IS PREFERRED**



First Preference



Second Preference

## EVALUATION OF ROUTE ALTERNATIVES - TRADE-OFF METHOD

### PREFERRED D2A (D2A NORTH VS. D2A SOUTH)



## Summary Results of Trade-off Method

As noted previously, the analysis and evaluation involved over 35 individual route segments. Initially, unique route segments were compared. Next, the preferred route segments were combined with common route segments for further comparison. The process culminated in the direct comparison of the best north route alternative and the best south route alternative. The following details the trade-offs made in this final step. Trade-off decisions are summarized on Exhibit 4.18.

The North and South routes each represent the set of route segments which resulted in the best combination of advantages and disadvantages to the study area along an alignment which passed either north or south of the large wetland complexes and settlement areas situated in the central study area.

The North route passes in close proximity to Keswick and Sutton, and through the urban area of Pepperlaw. Outside these urban areas, the route traverses primarily agricultural lands and the outer (as opposed to core) areas of natural features. This proximity to the three urban areas in the Town of Georgina is a large advantage, as this alternative can collect the long-distance traffic "at the source", thereby reducing the impacts to regional and local roads.

The North route is constrained in the area of Pepperlaw by residential and commercial development on both sides of Highway 48, and the large wetland complexes south of this development. The impacts associated with the North route to the community of Pepperlaw are a large disadvantage with this alternative. Exhibits 4.18G, H and I summarize the analysis and evaluation of the two route alternatives developed through Pepperlaw (B North and B South) to identify a crossing which would generate the lowest overall impacts.

The community of Pepperlaw is primarily oriented north-south, parallel to the Pepperlaw Brook, while Highway 48, Ontario Hydro and CN cross Pepperlaw in an east-west direction (See Exhibit 4.19). The community has developed up to, and in the case of Ontario Hydro, under, these crossings. B North runs adjacent to Highway 48 through Pepperlaw, essentially widening the existing east-west corridor. As a result, B North displaces development immediately adjacent to the existing Highway 48 corridor. South of Highway 48, B North impacts a residential cluster west of Pepperlaw Road, Quinn's Marina, a proposed residential subdivision (Pepperlaw Estates), Green Acres Trailer Park and several individual residences. North of Highway 48, several residences and a restaurant are impacted by the widened corridor. In addition, a service road is required to maintain access to Riverbank Drive and lands south of Highway 48. The additional property required for the service road increases the impacts to development on the south side of Highway 48.

The banks of the Pepperlaw Brook in the vicinity of the B North crossing have been disturbed by the existing Highway 48 crossing and the marina. The existing development has removed much of the riparian natural environment on both sides of the Brook, both north and south of Highway 48.

B South creates a new east-west corridor through a residential area of Pepperlaw south of the Cedardale Camp. This area is presently occupied by single family dwellings. The banks of the Brook in the vicinity of the B South crossing and the forested lands east of the Brook are essentially undisturbed and provide habitat for a large number of significant flora and fauna.

The impacts to Pepperlaw associated with either the B North or B South alternatives are a significant disadvantage of both routes. With the B North route, however, the impacts to the community of Pepperlaw are confined to an area currently used as a transportation corridor; properties in this area are currently exposed to the effects of a transportation corridor (for

example, this area has a higher ambient noise level than the area around the B South crossing). Although extending Highway 404 along the B North alignment would increase such effects, the magnitude of the increase would not be as great as for the area of B South, which is not currently as exposed to these effects.

The B South route generates a greater impact to the community of Pefferlaw, as a result of the new east-west crossing through the community. The B South alternative would create a new transportation corridor through the community, introducing the effects of such a corridor to an area of the community where these effects presently do not exist. The community as a whole, therefore, would be impacted by such an alternative. In addition, the disadvantages of the B South route alternative include property impacts to the residential area west of the Brook, and natural area east of the Brook.

In considering the differences in the impacts to Pefferlaw associated with the B North and B South route alternatives, the Project Team identified B North as the preferred route alternative, due to the lower impacts to the community as a whole generated by this route. The North route, therefore, includes route segment B North as the preferred crossing through Pefferlaw.

An advantage of the South route is that it avoids the urban areas of Georgina, resulting in lower impacts to the communities within the study area. Another advantage of the South route is that it improves the capacity of the study area road network. With the route situated well away from the urban areas, however, the existing road network must handle the long-distance traffic until it can access the Highway 404 extension. The road network does not have sufficient capacity to accommodate peak hour travel demands, and much of the study area road network will operate at or near capacity. The advantage to the road network associated with the South route is therefore less than that of the North route.

In addition, the South route crosses several natural features associated with the major river systems in the study area. These natural features are generally provincially significant wetlands. Therefore the impacts to the natural environment are a large disadvantage of the South route.

The analysis and evaluation of the North and South routes, along with the trade-offs identified by the Project Team, are included in Exhibits 4.18B and C.

In comparing the overall advantages and disadvantages of the two routes, the North route was preferred over the South route, because the North route generates greater benefits and lower overall impacts to the study area than the South route.

#### **4.5.3 Weighting/Scoring Method**

The weighting/scoring method produces a single numerical result to reflect the total impacts associated with a route alternative. The shortfalls of weighting/scoring are recognized, however this method provides an opportunity for the proponent to clearly demonstrate the consideration of input by stakeholders in the decision-making process. For these reasons, the Weighting/Scoring Method was used to verify each decision of the Trade-Off Method (Professional Judgment).

With the weighting/scoring method, evaluation criteria are given a weight, based on level of importance, and a score based on the magnitude of the impact. The weight and score of each criterion are multiplied together, and added together with the weight-score product of the other criteria to obtain a total weighted score for the route alternative. The alternative with the highest weighted score (i.e. the highest or lowest, depending on the scoring method used) is generally considered the preferred alternative.



# SCHEDULE 'E1' LAND USE PLAN

TOWN OF GEORGINA



## LEGEND

- SECONDARY PLAN BOUNDARY LINE
- RURAL
- RURAL SPECIAL DEVELOPMENT AREA
- RESIDENTIAL
- RESIDENTIAL SPECIAL DEVELOPMENT AREA
- COMMERCIAL
- COMMERCIAL SPECIAL STUDY AREA
- INDUSTRIAL
- INDUSTRIAL SPECIAL STUDY AREA
- RECREATIONAL COMMERCIAL SPECIAL STUDY AREA
- INSTITUTIONAL
- PRIVATE OPEN SPACE
- PUBLIC OPEN SPACE

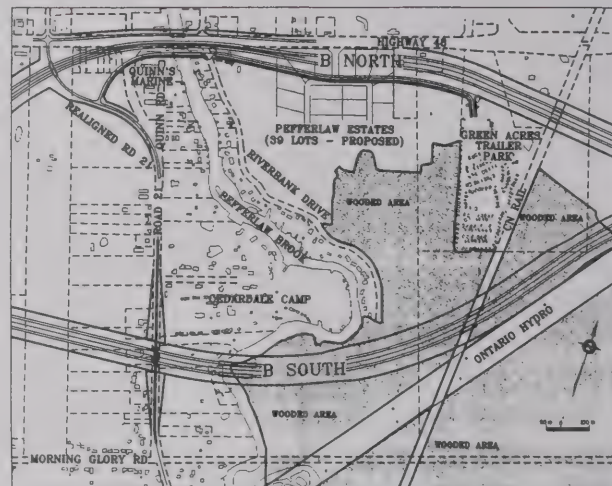
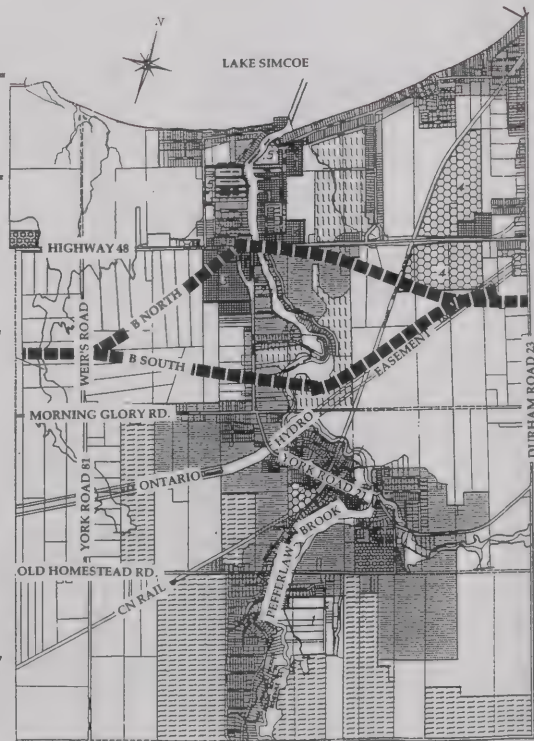
## KEY MAP



## REVISIONS

Revised Plan: January 1998  
 Author: [illegible]  
 Date: [illegible]

SCALE  
 0 500 1000 1500m







### **Establishing a Weight (Level of Importance)**

To determine the relative weight of each criteria, a total of 100 points were assigned among the five evaluation factors in proportion to the level of importance of each factor to the study area. A total of 100 points were also assigned to each factor and distributed among the criteria in proportion to the level of importance to that factor. Generally, more points are assigned to those criteria which are felt to be more important when assessing impacts generated by route alternatives, and fewer points are given to those criteria which are considered to be less important. The set of weights assigned to the evaluation criteria will be the same for all route alternatives.

Two weighting scenarios were used for this evaluation method. The first utilized a weighting scenario developed by the Project Team, and the second utilized a weighting scenario developed by interested individuals and interest groups.

To develop the Project Team weighting scenario, the specialists in each discipline were responsible for assigning the weights (level of importance) to the criteria within each factor. The Project Team, as a group, developed the weights for each factor.

Interest groups and interested individuals were asked for their input at the second and third set of Public Consultation Sessions to establish the relative weights that participants felt should be given to each criterion. This approach provided the Project Team with an understanding of the relative importance of each evaluation factor and criterion.

The Project Team and 'public' weighting scenarios are shown in Exhibit 4.20. The 'public' weights represent the calculated average expressed as a percentage of the numerical weights obtained from 137 comment sheets. The standard deviations provide an indication of the range of variation in numerical weights assigned by the individuals. These standard deviations, as a percent of the calculated average, range from approximately 70% to over 100% of the calculated average value of each criterion weight, indicating a significant variation in opinion as to the relative importance of each evaluation criterion.

In comparing the two sets of weightings, several observations can be made:

- The factor total weights are comparable, with the exception that the Project Team scenario carries a greater weight for the Social and Economic Environments and less weight for Heritage than the public scenario (As noted in Exhibit 4.17, the Project Team gave less weight (importance) to Heritage to avoid overemphasizing social impacts).
- Within the Natural Environment, the Project Team scenario carries more weight for 'habitat' criteria (i.e. aquatic habitat, wetlands, vegetation) than the public scenario (The Project Team considered habitat to be of greater importance, since habitats can serve a large number of wildlife species).

| WEIGHTINGS OF CRITERIA AND FACTORS  |               |               |
|-------------------------------------|---------------|---------------|
|                                     | PUBLIC        | PROJECT TEAM  |
| <b>FACTOR: TRANSPORTATION</b>       |               |               |
| Criteria:                           |               |               |
| Traffic Operations                  | 8.74 (10.1)   | 8.00          |
| Network Compatibility               | 7.36 (5.7)    | 8.00          |
| Cost                                | 6.51 (5.4)    | 4.00          |
| <b>TOTAL FOR FACTOR</b>             | <b>22.61</b>  | <b>20.00</b>  |
| <b>FACTOR: NATURAL ENVIRONMENT</b>  |               |               |
| Criteria:                           |               |               |
| Fisheries & Aquatic Habitat         | 3.73 (3.2)    | 5.00          |
| Wildlife                            | 5.37 (3.4)    | 2.50          |
| Wetlands                            | 4.87 (3.7)    | 6.25          |
| Vegetation                          | 3.56 (3.2)    | 6.25          |
| Groundwater                         | 5.97 (4.0)    | 3.75          |
| Geology                             | 2.27 (2.8)    | 1.25          |
| <b>TOTAL FOR FACTOR</b>             | <b>25.77</b>  | <b>25.00</b>  |
| <b>FACTOR: SOCIAL ENVIRONMENT</b>   |               |               |
| Criteria:                           |               |               |
| Community Effects                   | 9.01 (7.5)    | 15.00         |
| Aesthetics                          | 4.33 (3.7)    | 2.50          |
| Noise                               | 7.14 (5.6)    | 7.50          |
| <b>TOTAL FOR FACTOR</b>             | <b>20.48</b>  | <b>25.00</b>  |
| <b>FACTOR: ECONOMIC ENVIRONMENT</b> |               |               |
| Criteria:                           |               |               |
| Agriculture                         | 13.00 (11.6)  | 20.00         |
| Commercial/Industrial               | 6.79 (4.3)    | 5.00          |
| <b>TOTAL FOR FACTOR</b>             | <b>19.79</b>  | <b>25.00</b>  |
| <b>FACTOR: CULTURAL ENVIRONMENT</b> |               |               |
| Criteria:                           |               |               |
| Archaeology                         | 5.19 (3.9)    | 2.50          |
| Historical                          | 6.16 (4.6)    | 2.50          |
| <b>TOTAL FOR FACTOR</b>             | <b>11.36</b>  | <b>5.00</b>   |
| <b>TOTAL FOR ALL FACTORS</b>        | <b>100.00</b> | <b>100.00</b> |

\* Number in parentheses indicates the calculated standard deviation

## PROJECT TEAM AND PUBLIC WEIGHTING SCENARIOS



### Establishing a Score (Degree of Impact)

The score assigned to each criterion is based on the impact generated. Impacts can range from those that are positive (benefit the environment) to negative (detrimental to the environment). Accordingly, scores ranged between 0-8, as shown:

| NEGATIVE IMPACT |      |          | NO IMPACT |   | POSITIVE IMPACT |          |      |          |
|-----------------|------|----------|-----------|---|-----------------|----------|------|----------|
| 0               | 1    | 2        | 3         | 4 | 5               | 6        | 7    | 8        |
| ABSOLUTE        | HIGH | MODERATE | LOW       |   | LOW             | MODERATE | HIGH | ABSOLUTE |

For each route alternative, Project Team specialists assigned each criterion a score, based on an assessment of impacts as measured by the indicators and measures.

The results of the weighting/scoring evaluation are summarized in Exhibit 4.21. For further information and detailed results of the weighting/scoring method, refer to Appendix 6. Where the public and the Project Team identified the same route alternative as the preferred alternative, this preferred alternative was carried forward in the evaluation.

As indicated in Exhibit 4.21, the two weighting scenarios generated different preferred segments on two occasions (B1A vs. B1B and B North vs. B South. The total scores of the two route alternatives in question are very close (less than 2% difference). Given the high standard deviations associated with each criterion weight in the public weighting scenario, the weighting/scoring method did not clearly identify a preferred route alternative on these two occasions. The results of the weighting/scoring method in these two cases could not be used to verify the results of the Trade-Off Method.

#### 4.5.4 Consultation - Input to Route Evaluation

The proposed evaluation factors/criteria/indicators were first presented to stakeholders in the draft EAP. They were also displayed at each of the first three series of PCSs and comments on their validity were explicitly solicited by the Project Team. Throughout this process, no changes were made to the factors or criteria but a number of minor changes were made to the indicators and measures.

As discussed in Chapter 2, evaluation criteria were a major focus at the second series of workshops. Participants at these workshops reviewed the evaluation criteria with Project Team representatives. Exhibit 4.22 outlines the comments and concerns raised at this series of workshops and how they were addressed.

| Evaluation Segments |   | Preferred Route Segments Identified by Weighting/Scoring Method |                                 | Preferred Route Segments Identified by Trade-off Method |
|---------------------|---|---|---------------------------------|---|
|                     |   | Public Weighting Scenario                                       | Project Team Weighting Scenario |   |
| 1.                  | North vs. South   | North   | North                           | North   |
| 2.                  | B1 vs. B2 vs. B3  | B3  | B3                              | B3  |
| 3.                  | D2A/E1 vs. D2D/E1   | D2D/E1  | D2D/E1                          | D2D/E1  |
| 4.                  | B1A vs. B1B   | B1A   | B1B                             | B1B   |
| 5.                  | D1/E1 vs. D2A/E1 vs. D2B/E1                                     | D2A/E1  | D2A/E1                          | D2A/E1  |
| 6.                  | B1B vs. B1C   | B1B   | B1B                             | B1B   |
| 7.                  | B3A vs. B3B   | B3B   | B3B                             | B3B   |
| 8.                  | B North vs. B South   | B South   | B North                         | B North   |
| 9.                  | D2C/E1 vs. D2D/E1 vs. D2D/E2 vs. D2E/E1 vs. D2E/E2 (all from B) | D2D/E1 (from B)   | D2D/E1 (from B)                 | D2D/E1 (from B)   |
| 10.                 | C1 vs. C2   | C2  | C2                              | C2  |
| 11.                 | D2C/E1 vs. D2D/E1 vs. D2D/E2 vs. D2E/E1 vs. D2E/E2 (all from C) | D2D/E1 (from C)   | D2D/E1 (from C)                 | D2D/E1 (from C)   |
| 12.                 | D2A North vs. D2A South   | D2A South   | D2A South                       | D2A South   |

## RESULTS OF WEIGHTING-SCORING EVALUATION

| ISSUES  | RESPONSE  |
|---|---|
| <p><b>SOCIO-ECONOMIC ENVIRONMENT</b></p> <p><b>Community Effects</b></p> <ul style="list-style-type: none"> <li>• Concerned about increased development around interchanges</li> <li>• Change in quality of recreational experience (ie snowmobiling, cross-country skiing etc.,)</li> <li>• Property value impacts for properties in close proximity to the highway</li> <li>• Highway will effect long term development patterns not accounted for in Official Plans (i.e. greater than 20 years)</li> <li>• Effect on school bus routes (i.e. increased travel time)</li> <li>• Effect on schools (noise, air pollution, safety)</li> <li>• Effect on cemeteries</li> <li>• Effects on community boundaries</li> <li>• Should be measuring quality of life (effect on rural community)</li> <li>• Cost of extra emergency services that will be required because of the highway</li> <li>• Beaverton community boundary is bigger than shown in Official Plan</li> </ul> | <ul style="list-style-type: none"> <li>• This is a planning issue which is handled at the municipal level in accordance with official plans.</li> <li>• This is considered within indicator 3.1 c) displacement of institutional and recreational features and 3.1 d) disruption of institutional and recreational features.</li> <li>• Because highway proximity is only one factor that may affect property values, this study will not address the issues of property values either increasing or decreasing. However, indirect property impacts will be measured under noise, visual intrusion and community effects (i.e. cohesion, stability and character).</li> <li>• The Ministry of Transportation is unable to speculate on potential impacts to development outside of Official Plan time frames.</li> <li>• Comment noted and indicator added.</li> <li>• Potential mitigation will be investigated for the preferred route. The effect on air quality is expected to be minimal, given the open rural character of the landscape.</li> <li>• Cemeteries avoided during route generation.</li> <li>• Measured as part of effect on community character and cohesion.</li> <li>• Measured as part of effect on community cohesion, effect on community stability, effect on community character.</li> <li>• Accident rates on a freeway are 1/7 accident rates on regional roads. Therefore the highway will result in fewer accidents, and thus lower costs.</li> <li>• Comment noted (not an indicator issue).</li> </ul> |

## COMMENTS RECEIVED ON EVALUATION CRITERIA



| ISSUES  | RESPONSE  |
|---|---|
| <b>Agricultural</b> <ul style="list-style-type: none"> <li>• Salt spray impacts to agricultural operations</li> <li>• Impact on local agricultural economy should also include loss of revenues for ancillary businesses (ie. feed shops, co-ops etc.,)</li> <li>• Agriculture operations should be assessed on future potential (highest and best use)</li> <li>• Must consider linked operations</li> </ul> | <ul style="list-style-type: none"> <li>• Will be examined as a component of the impact to the future viability to existing operations. MTO is researching and testing alternative de-icing materials and methods.</li> <li>• Number of farms displaced is a surrogate measure for impact on the local economy.</li> <li>• Indicator added which assess soil classification.</li> <li>• Linked operations are considered.</li> </ul> |
| <b>Commercial/Industrial</b> <ul style="list-style-type: none"> <li>• Should be measuring business bypass effects</li> <li>• Tourism revenue as a result of impacts to Lake Simcoe</li> </ul>   | <ul style="list-style-type: none"> <li>• While a highway through the study area will benefit the regional economy, the MTO currently does not assess the potential effect of business bypass.</li> <li>• No impact is anticipated as highway impacts to Lake Simcoe will be minimized through MTO's stormwater quality management.</li> </ul>   |

Note: Agencies provided no comments related to the evaluation criteria

## COMMENTS RECEIVED ON EVALUATION CRITERIA

#### 4.6 ASSESSMENT OF THE PREFERRED ALTERNATIVE

The evaluation of route alternatives identified route segments A/North/E1 as the preferred route alternative for extending Highway 404 as a freeway. This assessment of the preferred alternative is intended to review in more detail, the basis for recommending improvements in the northeastern portion of the study area.

As discussed in Chapter 3, improvements to the transportation network of northern York and Durham Regions are required to accommodate projected commuter and recreational travel needs. In 2021, if Highway 404 were to be extended to the north junction of Highway 12/48 as a freeway:

- as illustrated in Exhibit 4.24, much of the study area road network would operate below capacity during weekday/commuter peak travel periods;
- as illustrated in Exhibit 4.24, the portion of the road network west of Highway 48 would operate at or near capacity; and
- the study area road network would operate below capacity for recreational traffic.

Exhibits 4.23 and 4.24 indicate the benefits provided to the transportation road network in the study area resulting from the extension of Highway 404 as a freeway. Extending Highway 404 addresses both the need and opportunity to protect for the implementation of transportation improvements in northern York and Durham Regions.

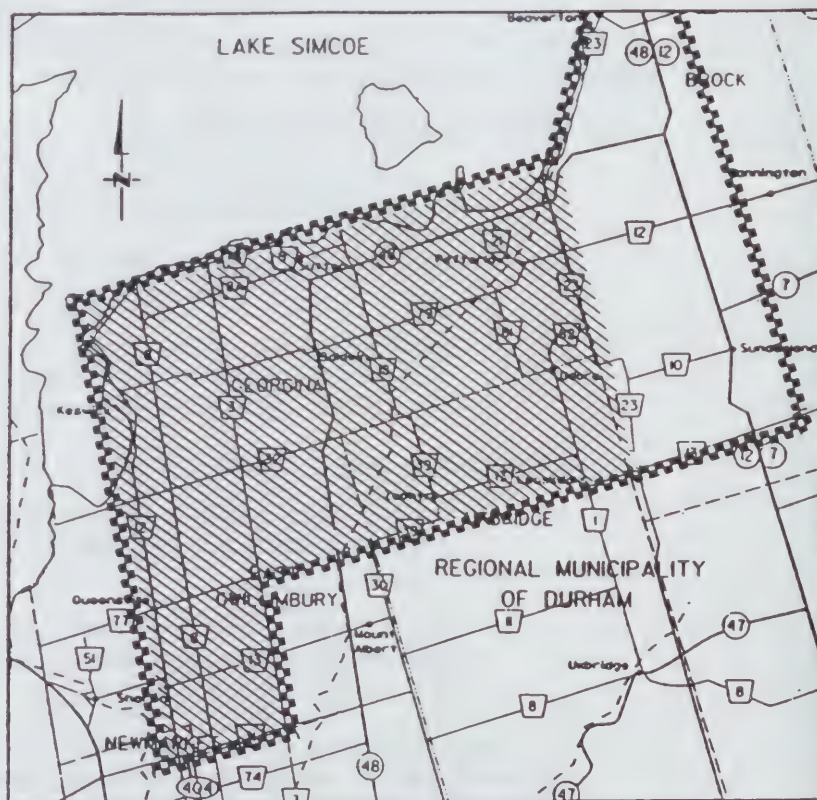
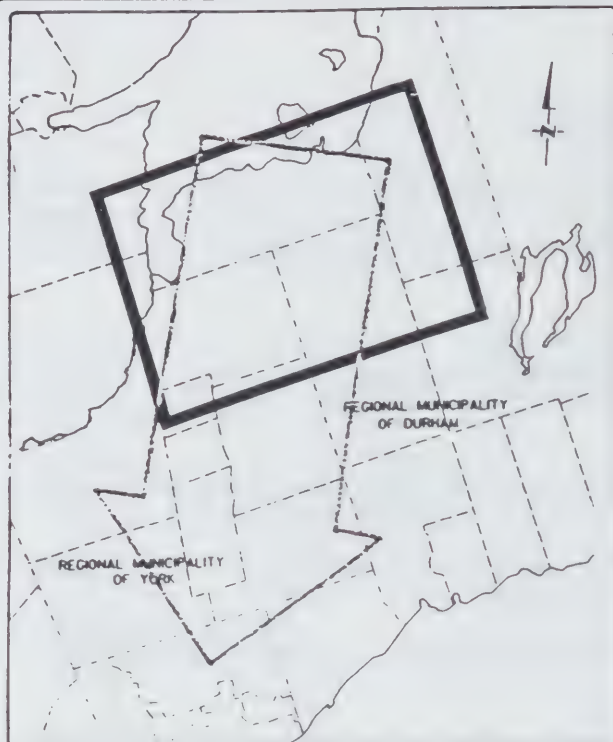
##### Between Davis Drive and Durham Road 23.


- a freeway is required to improve capacity of the network to accommodate forecasted commuter needs;
- a freeway is required to improve capacity of the network to accommodate forecasted recreational travel needs; and,
- opportunities for protecting property or right-of-way for a new highway are continuing to be diminished by proposed approved development in areas around Sharon, Queensville, Keswick, Sutton and Pepperlaw.


##### From east of Durham Road 23 to the south junction of Highway 12/48:

- the projected weekday/commuter peak hour traffic volumes for 2021 are less than that which warrants a freeway, but slightly greater than the capacity of a 2-lane highway;
- the projected recreational peak hour traffic volumes are greater than the projected 2021 commuter peak hour traffic volumes, but are within the capacity of a 4-lane highway.

Therefore, to address the weekday/commuter and recreational 2021 peak period traffic demands east of Durham Road 23 to the south junction of Highway 12/48, a 4-lane highway is required.



 STUDY AREA LIMIT

 PORTION OF STUDY AREA WITH ROAD NETWORK AT OR NEAR CAPACITY

## TRAFFIC OPERATIONS ON FUTURE ROAD NETWORK DO NOTHING SCENARIO (2021 WEEKDAY AM PEAK HOUR)

 **Ontario**  
Ministry of Transportation

 **COLE SHERMAN**

# HIGHWAY 404 EXTENSION

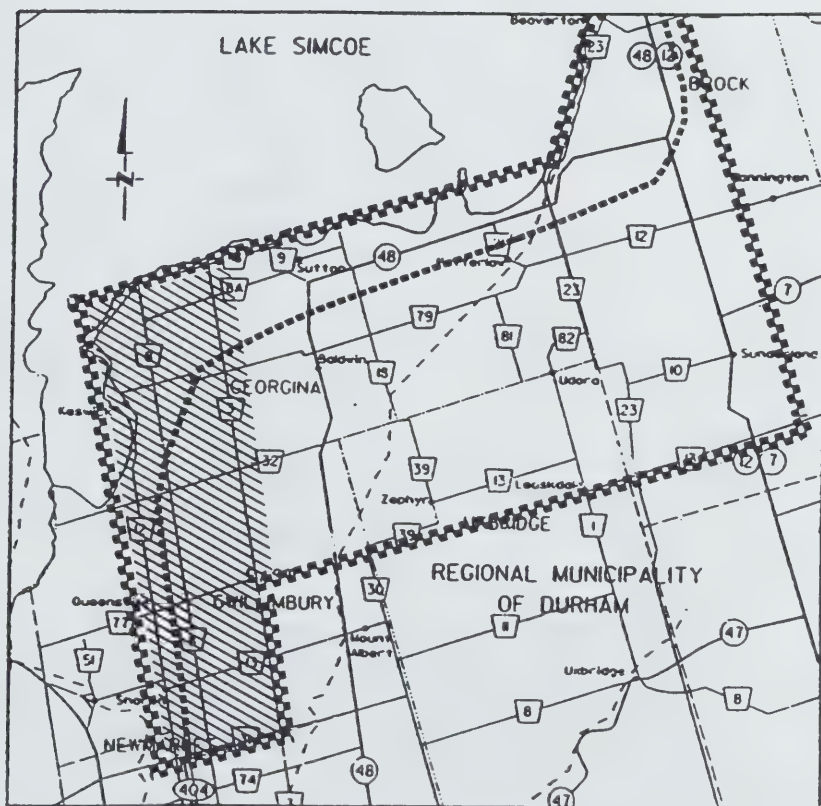
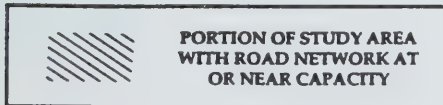
Davis Drive to Highway 12

Route Planning Study and Environmental Assessment

EXHIBIT

4.23





**TRAFFIC OPERATIONS ON FUTURE ROAD NETWORK  
PREFERRED ROUTE SCENARIO (2021 WEEKDAY AM PEAK HOUR)**

# HIGHWAY 404 EXTENSION

## Davis Drive to Highway 12

## Route Planning Study and Environmental Assessment

## EXHIBIT

4.24

Between the north and south junctions of Highway 12/48:

- the projected weekday/commuter volumes for 2021 are less than that which warrants a freeway, and slightly less than the capacity of a 2-lane highway;
- the projected recreational volumes are greater than the capacity of a 2-lane highway, but are within the capacity of a 4-lane highway.

The ministry has been conducting another study to address short- to mid-term operational improvements between the north and south junctions of Highway 12/48. In recognition of the findings of the Highway 404 study, the ministry has modified the Highway 12/48 study to address long-term recreational needs, and has suggested the condition of approval regarding the Highway 12/48 study, identified in Section 1.3.

#### **4.7 REFINEMENTS TO THE PREFERRED ALTERNATIVE**

Based on comments received at the fourth series of PCSs, route refinements were made to the Preferred Alternative where it was shown that such refinements would result in an overall reduction in impacts (see Exhibit 4.25). In all, three route refinements were implemented.

##### **4.7.1 Basis for Route Refinements**

Once the Preferred Alternative was identified, work began to examine in greater detail the alignment's location, right-of-way requirements and associated impacts. Using recent (1996) air photography to generate base maps of the proposed right-of-way, the location of the right-of-way was determined so as to reduce impacts to existing land uses. The details provided in the base maps included:

- more accurate information on location of existing structures,
- detailed topographical information; and,
- edges of large natural features (i.e. forests and wetlands).

In addition to the improved mapping, the proposed right-of-way was field checked by the Project Team natural environment, agricultural and heritage specialists. The field checking exercise helped to provide additional details for the impacts associated with the alignment of the Preferred Alternative and assess the opportunities for mitigation to reduce these impacts.

Public input also factored into refining the Preferred Alternative. The fourth and fifth series of PCSs, featuring plans of the Preferred Alternative showing individual property impacts, was used to discuss opportunities for reducing property impacts with affected land owners.

##### **4.7.2 Vachell Swamp**

The Vachell Swamp is a large contiguous feature situated south of Sutton and east of Highway 48. The Swamp is a significant natural area, consisting of densely forested swamp on clay and organic soils. Secondary source data from MNR indicated that this feature were evaluated as a Class 6 (locally significant) wetland. The swamp is also designated as an Area of Natural or Scientific Interest.

During the route generation stage, the location of the proposed alignment also considered surrounding agricultural and residential uses. To avoid the Vachell Swamp altogether, the alignment would have to be situated immediately south of Highway 48 (refer to Exhibit 4.26). Such an alignment would have negative impacts on the agricultural uses in the area, and residences along Highway 48 and Park Road (York Road 18).





### LEGEND

- Highway 404 Study Area
- Bradford Bypass Study Area
- Technically Preferred Route
- Interchange Locations



The total area of Vachell Swamp is 142.5 ha. (MNR evaluation, 1987). Within the narrowing of the north end of Vachell is an interface of a swamp unit dominated by Black Ash, Red Maple and Speckled Alder, and a cattail marsh. Open marsh comprises a small part of this wetland complex, the vast majority of it being treed and shrub swamp. The original alignment severed a portion of the swamp at the north end from the rest of the feature. The original alignment was located to avoid the cattail marsh situated within the swamp.

The land uses bordering the Vachell Swamp include high value agricultural operations to the west, a residential cluster along Park Road, concentrated more at the north end near Highway 48 and agricultural operations to the east.

Impacts to each feature in the area can be reduced in the following manner:

- the beef/dairy operations west of Park Road require sufficient lands immediately around the buildings for pasture; impacts to these operations would be reduced by locating the highway as far south of the existing buildings as possible. Such an alignment would impact the Vachell Swamp;
- the core area of the swamp is situated south of Latimer Road (6th Concession); impacts to this feature would be reduced by locating the highway as close to Highway 48 as possible. Such an alignment would impact agricultural operations and the residential cluster;
- impacts to the residential area along Park Road would be reduced by locating the highway as far south of Highway 48 as possible. Such an alignment would impact the Vachell Swamp;
- the impacts to the agricultural operations east of Park Road would be reduced by locating the highway south of the woodlot/working field boundary. Such an alignment would impact the Vachell Swamp.

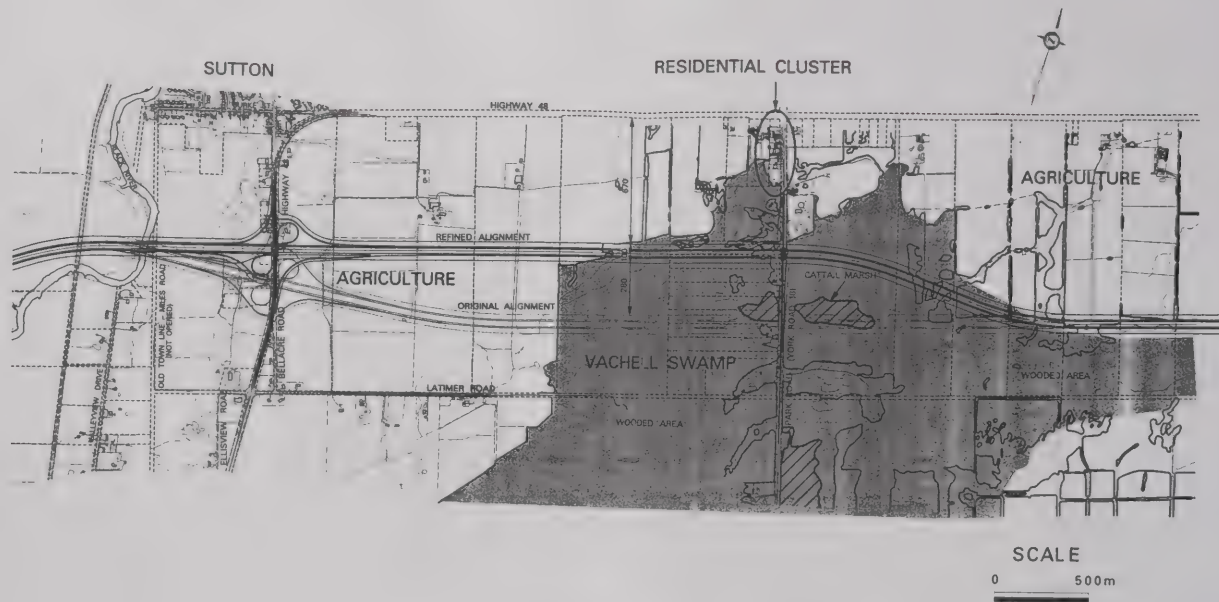
Although any crossing of the Vachell Swamp is not ideal from a natural environment perspective, avoiding it completely would increase impacts to agricultural operations and the residential cluster.

The assessment of the route refinement in this location is shown in Exhibit 4.27. The refined alignment reduced impacts to the Vachell Swamp while increasing the impacts to residences and the agricultural operations. Based on the significance of the Swamp, however, the reduced impacts to the Swamp outweighed the increased impacts associated with the refinement.

#### **4.7.3 Pepperlaw to Durham Road 23**

At the fourth series of Public Consultation Sessions (November, 1996) several comments were received regarding the proposed alignment between Pepperlaw Road (York Road 21) and Durham Road 23. Specific requests were received from landowners affected by the proposed alignment to reduce potential impacts. These include:

- Quinn's Marina is situated on the west side of the Pepperlaw Brook immediately south of Highway 48. The owner's of the marina indicated that they would like to remain in business if at all possible, although the proposed route displaced their existing showroom/office building and made much of their waterfront inaccessible. If sufficient lands were available for relocating the showroom/office building and sufficient waterfront access for lifting boats into and out of the brook, they felt that the business would remain viable.







|   |  |                        |
|---|--|------------------------|
| <b>ROUTE: TECHNICALLY PREFERRED ROUTE</b> | From: Black River  | To: Stoney Batter Road |
| <b>DESCRIPTION OF EXISTING ALIGNMENT:</b> | <ul style="list-style-type: none"> <li>From Black River, alignment curves south to reduce impacts to high value agricultural operations and residences along Park Road</li> <li>Severs portion of Vachell Swamp</li> </ul> |                        |
| <b>DESCRIPTION OF REFINEMENT:</b>         | <ul style="list-style-type: none"> <li>Alignment passes along north edge of Vachell Swamp.</li> </ul>  |                        |
| <b>REASON FOR PROPOSING REFINEMENT:</b>   | <ul style="list-style-type: none"> <li>Reduces overall impacts associated with route alternative by reducing impact to Vachell Swamp</li> </ul>  |                        |

| FACTOR/CRITERIA               | ASSESSMENT                       | COMMENTS  |
|-------------------------------|----------------------------------|---|
| <b>TRANSPORTATION</b>         |                                  |   |
| Traffic Operations            | No Significant Change in Impacts | No significant change in volume/route length with new alignment.  |
| Network Computability         | No Significant Change in Impacts | No change in access to/from local road network with new alignment.  |
| Cost                          | No Significant Change in Impacts | Less than 10% difference in costs between the two alignments.   |
| <b>NATURAL</b>                |                                  |   |
| Fisheries and Aquatic Habitat | No Significant Change in Impacts | Both alignments likely cross ephemeral tributary draining wetland   |
| Wildlife                      | Reduction in Impacts             | Refinement reduces loss of significant wildlife habitat as a result of passing through somewhat disturbed forest instead of undisturbed wetland; similar impacts to greenway. |
| Wetlands                      | Significant Reduction in Impacts | With new alignment, highway avoids wetland feature of swamp; effects remain due to proximity.   |
| Vegetation                    | Reduction in Impacts             | With new alignment, loss of vegetation is reduced; vegetation unit impacted with new alignment is more disturbed than areas along existing alignment.                         |
| Ground Water                  | No Significant Change in Impacts | Soil type in area of both alternatives not sensitive to contamination.  |
| <b>SOCIAL</b>                 |                                  |   |
| Community Effects             | Increase in Impacts              | Residences Displaced: Existing Alignment = 7; Refinement = 8<br>Properties Disrupted: Existing Alignment = 11; Refinement = 12  |
| Aesthetics                    | No Significant Change in Impacts |   |
| Noise                         | Increase in impacts              | 1 receiver with noise level increase > 5dBA but < 10 dBA, 1 receiver with noise level increase >10 dBA with refinement  |
| <b>ECONOMIC</b>               |                                  |   |
| Agriculture                   | Significant Increase in Impacts  | Refinement displaces a High Value Farm and increases impacts to linked farming operations.  |
| Commercial/Industrial         | No Significant Change in Impacts |   |
| <b>CULTURAL</b>               |                                  |   |
| Archaeological                | No Significant Change in Impacts |   |
| Heritage Resources            | Increase in Impacts              | Refinement disrupts two additional farmscapes.  |

**CONCLUSIONS**

Significant reduction in impacts to natural environment associated with the highly significant Vachell Swamp outweight increase in impacts to social and economic environments. Refinement of alignment is recommended in this area.

- Several residents along the east side of the Pepperlaw Brook expressed concern with the proximity of the proposed highway to the primarily waterfront cottage area. Residents commented that keeping the proposed highway and service road as far north as possible would reduce property, noise and aesthetic impacts.
- Pepperlaw Estates is a proposed residential subdivision situated on lands east of Riverbank Drive. The plan of subdivision proposes thirty-nine estate lots be constructed on lands between Highway 48 and the floodplain limit approximately 600 metres south of Highway 48. The development included direct access to Highway 48 via a proposed entrance approximately 450 metres east of the Riverbank Drive/Highway 48 intersection. The proposed highway and service road alignment disrupted the proposed plan of subdivision, including removing the entrance to Highway 48, and reduced the amount of developable land available to the owner. The owner commented that keeping the new highway and service road as close to Highway 48 as possible would reduce the impacts to the proposed subdivision.
- Green Acres Trailer Park is a year-round mobile home park co-operatively owned and managed by approximately 230 tenants. They have made substantial investments in providing year-round services and amenities, such as a clubhouse, swimming pool, and communal water and septic systems. Almost all the developable land on the property has been developed. The proposed alignment displaced the clubhouse and swimming pool and disrupted the communal water supply system. The board of directors expressed concern that there was insufficient land available for relocating the clubhouse and pool, which are highly valued and used by the members. Keeping the alignment closer to Highway 48 would avoid the displacement of these features, and thereby reduce the impacts to the park.

In addition to these property impact concerns, comments were also expressed that the community of Pepperlaw was directly impacted by the proposed highway, but did not have direct access to the highway. (The closest interchange to Pepperlaw was the interchange at Durham Road 23, east of Pepperlaw.) It was suggested that the provision of an interchange at Pepperlaw Road or Weir's Sideroad would improve access to the community, thereby providing a greater benefit to the community to offset the direct impacts.

The alignment of the highway was refined to address these concerns. This refinement included:

- reducing the width of the median from 30 metres to 7.5 metres to reduce property requirements for the new highway; a median barrier will be installed in this section, in accordance with MTO design requirements.
- shifting the alignment of the highway and service road as far north as possible to reduce property impacts to lands south of Highway 48;
- terminating the service road at Riverbank Drive to reduce property impacts to the proposed subdivision; an allowance for a service road connection to Highway 48 via an underpass at the Green Acres Trailer Park has been provided as an alternate access to the subdivision and adjacent lands;
- keeping the alignment of the new highway as close to existing Highway 48 as possible across the Green Acres Trailer Park property to avoid the clubhouse, swimming pool and underground servicing; this realignment resulted in the displacement of one additional residential property adjacent to the trailer park.

The proposed refinement reduced overall property impacts in this area by reducing the property requirements for the new highway while maintaining existing accesses.



In addition, a partial interchange was added at Pepperlaw Road. The partial interchange will allow access to Pepperlaw Road for vehicles traveling eastbound on the Highway 404 extension via a direct ramp connecting Highway 404 to Pepperlaw Road. In addition, access to westbound Highway 404 would be provided via a loop ramp connecting northbound Pepperlaw Road to Highway 404 and a direct ramp connecting Highway 48 to Highway 404.

#### **4.7.4 Durham Road 23 to Highway 12**

At the fourth series of PCSs, this section of the proposed alignment was identified as a transition zone, within which the Highway 404 extension would change from a controlled access freeway on its own right-of-way to a special controlled access four-lane undivided highway located within the existing right-of-way of Highway 48.

A safety review on Highway 407 conducted by the Professional Engineers Ontario (PEO) in early 1997, recommended that for all highways, the design community must ensure that "safety is considered explicitly in the design process". In response, to this recommendation the 4-lane cross section was enhanced with a median in order to improve safety. This is based on a review of similar 4-lane undivided and divided facilities, and it was found that a median effectively eliminates collisions due to left turns or cross-overs. The median options considered were a narrow median with concrete barrier, and a wide grassed median.

Although more property is required, a wide grassed median is preferred over a narrow median with concrete median barrier for the following reasons:

- safer recovery area for out-of-control vehicles;
- better refuge for disabled vehicles
- lower construction cost and high salvage of the existing highway
- lower traffic impacts during construction
- less obstruction to wildlife crossings.

Since the most of the properties are large parcels, with relatively few residences adjacent to both sides of the highway, it was decided that the benefits of the wide grassed median outweighed the property impacts.

In order to minimize the property impacts, three alternatives for implementing the wide grassed median were considered:

1. Construct median and two additional traffic lanes along north side of existing Highway 48;
2. Construct median and two additional traffic lanes along south side of existing Highway 48;
3. A combination featuring construction of the median and additional traffic lanes along the south side of existing Highway 48 for the portion between Brock Concession Road 14 and the former Brock-Thorah Town Line, then switching to the north side of Highway 48 between Brock-Thorah Town Line and the south junction of Highway 12/48.

An assessment of impacts with these three alternative determined that the combination alternative was preferred. This alternative avoided the existing businesses and many of the residences situated immediately adjacent to the highway right-of-way while generating minor impacts to wetlands. Details of this assessment are included in Appendix 6.



The existing Highway 48 right-of-way will therefore be widened to accommodate a grass median and intersections at the 14th Concession and 17th Sideroad (North). The existing intersection of Highway 48 and Highway 12 will be upgraded to an interchange. In addition, the highway right-of-way in the transition zone will be designated "special controlled access". Under this designation, no new entrances to the highway would be permitted, and conversion of existing entrances (i.e. from field entrance to residential entrance) would be subject to review by MTO.

In response to concerns expressed by local property owners, the Township of Brock and the Ministry of Agriculture, Food and Rural Affairs, an evaluation of an alternative route for the transition section was investigated. The suggested alternative route incorporated the proposed alignment for the transition section between Durham Road 23 and the north bend of Highway 48 (north of Concession Road 14), then followed the alignment identified as route segment D2E in the route analysis phase of the study. Alternative D2E was aligned midway between Concessions 2 and 3 (refer to Exhibit 4.28A) in Brock Township.

Alternative D2E was compared to the twinning of Highway 48 from a common point south of Brock-Thorah Town Line, to Highway 12/48. Both alternatives included an interchange with Highway 12/48. The results of the analysis indicated that, although the differences in impacts to the natural, social and cultural environments generated by the two route alternatives were slight, Alternative D2E carried much higher costs than twinning Highway 48 (refer to Exhibit 4.28B and C).

One advantage of Alternative D2E noted by the supporters of this alignment was that, as a new road corridor, D2E would provide better traffic operations; the potential for slow-moving vehicles (e.g. farm equipment, school buses) mixing with long-distance through traffic would be less than twinning the existing highway. However, traffic operations would also be improved with twinning Highway 48 at a much lower cost than Alternative D2E. Turning refugia in the median and turning basins at intersections will be incorporated with this alternative to address safety concerns for slow-moving vehicles. Twinning Highway 48 was therefore preferred.

Because the residents along Highway 48 between Durham Rd 23 and Highway 12 feel that their concerns are still unresolved, the ministry is committing to reassess the current and projected traffic prior to construction of this portion of the Highway 404 Extension to ensure that the recommended plan is still appropriate. Consultation and documentation of this analysis will conform with Section 5.3.

#### **4.8 COMPARISON OF THE TECHNICALLY PREFERRED ROUTE TO THE DO-NOTHING ALTERNATIVE**

The Technically Preferred Route, incorporating the above refinements, is shown schematically in Exhibit 4.29, and described in greater detail in Chapter 5.

The last step of the evaluation process was to compare the Technically Preferred Route alternative to the Do Nothing Alternative. As noted in Section 3.3, although the Do-Nothing alternative was not to be considered as a reasonable alternative for addressing the transportation problems/opportunity in the study area, the Do-Nothing would be carried forward for comparison with the Technically Preferred Route to demonstrate that the advantages of proceeding outweigh the disadvantages to the proponent and the people of the Province.

The Do Nothing alternative was defined as no significant changes or actions being taken to either manage demand, expand infrastructure or improve operations. The Do Nothing alternative assumed all currently planned transportation infrastructure improvements to be undertaken by York Region, Durham Region and the Ministry of Transportation will take place.



EVALUATION OF TRANSITION SECTION ALTERNATIVES  
(TWIN HIGHWAY 48 vs. "D2E")

 Ontario  
Ministry of Transportation

 COLE,  
SHERMAN













**HIGHWAY 404 EXTENSION**  
Davis Drive to Highway 12

Route Planning Study and Environmental Assessment

EXHIBIT

4.28A



| FACTOR/Criteria   | Twin Hwy 48   | D2E   | COMMENT   |
|---|---|---|---|
| <b>1. TRANSPORTATION</b>  |   |   |   |
| <b>1.1 Traffic Operations</b> <ul style="list-style-type: none"> <li>Examines how well each alternative will allow traffic to move through the study area.</li> </ul>   |    |    | <p>Both alternatives provide a benefit to traffic operations, however D2E has better operations because it has a lower potential for slow-moving vehicles.</p> <p><b>D2E has a moderate benefit, while Twinning Hwy. 48 has a low benefit.</b></p>  |
| <b>1.2 Network Compatibility</b> <ul style="list-style-type: none"> <li>Examines how compatible each alternative is with the existing road network and the ability to upgrade each alternative to meet future needs.</li> </ul> | SAME  | SAME  | <p>Both alternatives provide a benefit to the transportation network: Each alternative will reduce volumes and improve operations on the local road network, and accommodate upgrades.</p> <p><b>Both alternatives have a moderate benefit to the network.</b></p>  |
| <b>1.3 Cost</b> <ul style="list-style-type: none"> <li>Examines the short- and long-term cost of each roadway alternative.</li> </ul>   |    |    | <p>D2E has higher construction, operation and maintenance costs than twinning Hwy. 48.</p> <p><b>D2E has a moderate cost impact, while twinning Hwy. 48 has a low cost impact.</b></p>  |
| <b>2. NATURAL ENVIRONMENT</b>   |   |   |   |
| <b>2.1 Fisheries and Aquatic Habitat</b> <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on water quantity, quality, fish species and aquatic habitat.</li> </ul>                         | No Impact   | No Impact   | <p>No fisheries or aquatic habitat are located in the vicinity of either route.</p> <p><b>Neither alternative produces an impact.</b></p>   |
| <b>2.2 Wildlife</b> <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on wildlife species and habitat.</li> </ul>   | SAME  | SAME  | <p>Twinning Hwy. 48 may potentially affect the area's sensitive species (heronry) during construction, but is not likely to have a long term impact. D2E represents a new disturbance to wildlife and habitat, primarily through edge impacts to habitat areas.</p> <p><b>Both alternatives result in similar low impacts.</b></p>          |
| <b>2.3 Wetlands</b> <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on wetland resources.</li> </ul>  |  |  | <p>Twinning Hwy 48 has a minor impact to a fragmented portion of the Gibson Hill Swamp, while D2E displaces a 20% of the Brock 2 Wetland, which is a seasonal wetland.</p> <p><b>Both alternatives have a low impacts to wetlands, with Twinning Hwy. 48 having slightly lower impacts.</b></p>   |
| <b>2.4 Vegetation</b> <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on vegetation units and individual specimens.</li> </ul>  |  |  | <p>D2E removes more forest cover than twinning Hwy. 48; although D2E affects primarily the edges of small woodlots the quality of the linkage loss with D2E was considered to be more significant than that with twinning Hwy. 48.</p> <p><b>Both alternatives have low impacts to vegetation, but D2E has slightly higher impacts.</b></p> |
| <b>2.5 Ground Water</b> <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on commercial and domestic water supply.</li> </ul>   |  |  | <p>Twinning Highway 48 will disturb less than one-half the area of hydrogeologically sensitive lands, and cross one-tenth the area of high ground water table, than Alternative D2E.</p> <p><b>Twinning Highway 48 has low potential to impact ground water while Alternative D2E has moderate potential impacts.</b></p>                   |
| <b>2.6 Geology</b> <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on significant landforms.</li> </ul>   |  |  | <p>Alternative D2E has a potential impact to a landform (Raised Beach), while twinning Highway 48 has no impacts to the landform.</p> <p><b>Alternative D2E has a low potential impact to geology, while twinning Highway 48 has no impact.</b></p>   |













First Preference



Second Preference

## EVALUATION OF TRANSITION SECTION ALTERNATIVES (TWIN HIGHWAY 48 VS. "D2E")



| FACTOR/Criteria   | Twin Hwy 48   | D2E   | COMMENT   |
|---|---|---|---|
| <b>3 SOCIAL ENVIRONMENT</b>   |   |   |   |
| 3.1 Community Effects <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on communities, neighbourhoods, individuals, and related land uses (residential, institutional, recreational).</li> </ul> |    |    | D2E has a greater disruption to properties and a higher impact to community character, because it creates a new road corridor through existing farmsteads. Twinning Highway 48 is a widening of an existing road corridor, which is more compatible with the surrounding land uses, and less disruptive to properties.<br><br><b>Both alternatives have moderate impacts to the community, but D2E has slightly higher impacts.</b> |
| 3.2 Aesthetics <ul style="list-style-type: none"> <li>Examines the visual impacts of each alternative.</li> </ul>   |    |    | D2E introduces aesthetic impacts to farmsteads while twinning Highway 48 has no new aesthetic impacts to residences along Highway 48.<br><br><b>Twinning Hwy. 48 has no impacts, while D2E has moderate potential impacts.</b>  |
| 3.3 Noise <ul style="list-style-type: none"> <li>Examines the noise impact each alternative will have on adjacent receivers.</li> </ul>   | SAME  | SAME  | Both alternatives produce similar potential noise impacts; Alternative D2E will significantly increase noise levels, while twinning Highway 48 will raise noise levels by a smaller amount to significant levels.<br><br><b>Both routes may produce moderate impacts.</b>   |
| <b>4 ECONOMIC ENVIRONMENT</b>   |   |   |   |
| 4.1 Agricultural <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on farming operations and employment.</li> </ul>   |    |    | D2E has higher impacts to soil capability and slightly higher impacts to farm operation units.<br><br><b>Both alternatives have a moderate impact to agriculture, with Twinning Hwy. 48 having slightly lower impacts.</b>  |
| 4.2 Commercial/Industrial <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on commercial, industrial and tourism based businesses and employment.</li> </ul>                                     | SAME  | SAME  | D2E has a minor disruption to an industrial property while twinning Highway 48 does not affect any businesses. The minor impact with D2E involves relocation of the entrance of the hydro substation, which is readily mitigated. There is therefore virtually no difference in impacts with these two alternatives.<br><b>Both alternatives have no impacts to commercial/industrial properties.</b>                               |
| <b>5 CULTURAL ENVIRONMENT</b>   |   |   |   |
| 5.1 Archaeological <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on archaeological features.</li> </ul>   |  |  | Widening Highway 48 will have less potential archaeological impact than building new sections of highway. Route D2E has more land within 200 metres of a water source, and more land within 500 metres of Lake Algonquin beach ridge than Highway 48.<br><b>Alternative D2E has a moderate potential impact to archaeological features, while twinning Highway 48 has low potential impacts.</b>                                    |
| 5.2 Historical <ul style="list-style-type: none"> <li>Examines the impact each alternative will have on heritage features.</li> </ul>   |  |  | Alternative D2E displaces and disrupts cultural landscapes. Twinning Hwy. 48 does not displace any cultural landscape units, but disrupts some landscape units.<br><b>Both alternatives produce moderate impacts to heritage features. Twinning Hwy. 48 produces slightly lower impacts.</b>  |

### SUMMARY OF TRADE-OFFS

The differences between the two alternatives are slight, with D2E providing better traffic operations benefits than twinning Highway 48, but with higher costs. Since twinning Highway 48 provides acceptable traffic operations at lower costs, twinning is preferred.

**THEREFORE, TWINNING HIGHWAY 48 IS PREFERRED**



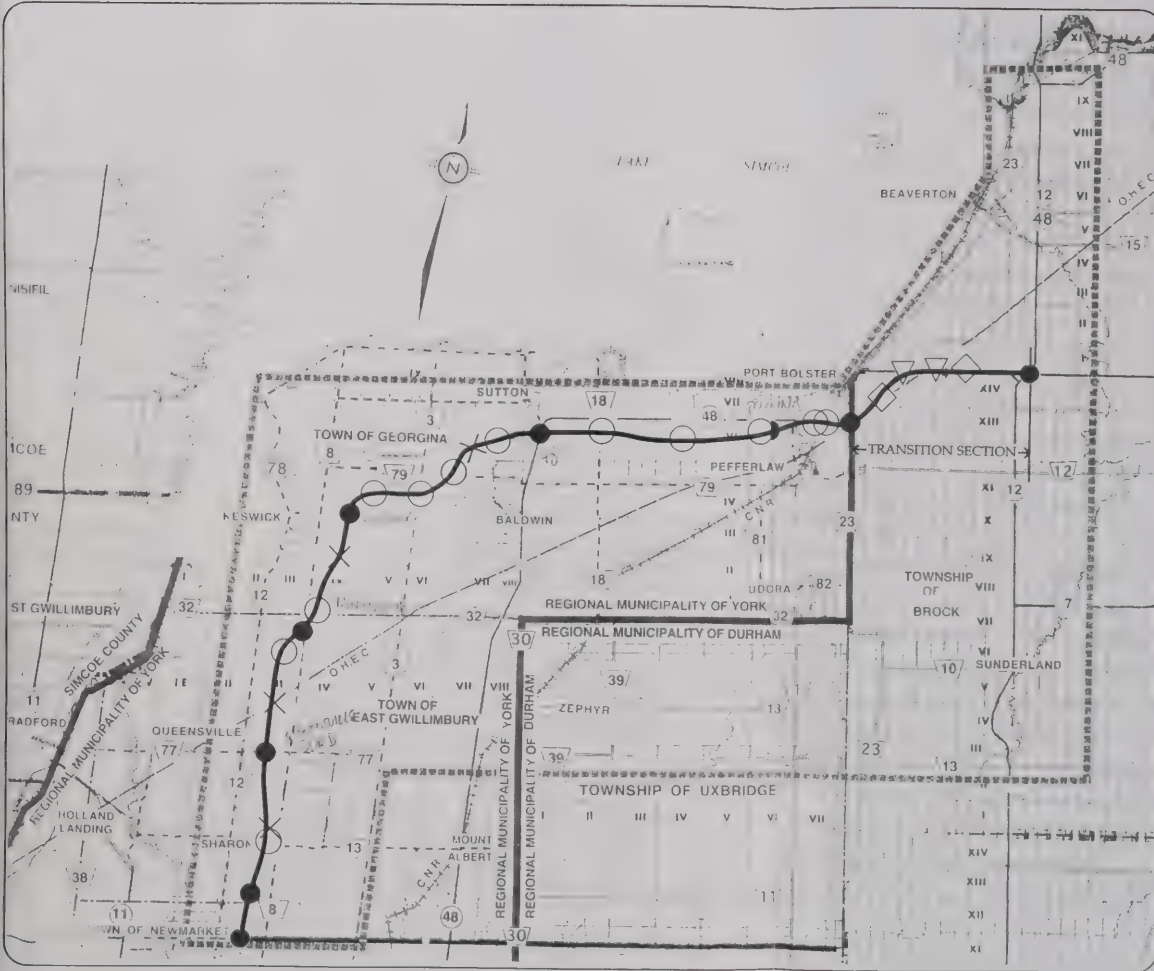
First Preference



Second Preference

## EVALUATION OF TRANSITION SECTION ALTERNATIVES (TWIN HIGHWAY 48 vs. "D2E")

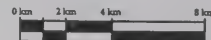




## TECHNICALLY PREFERRED ROUTE

### LEGEND

|                                  |                       |
|----------------------------------|-----------------------|
| STUDY AREA LIMIT                 | -----                 |
| INTERCHANGE LOCATIONS            | FULL: ●<br>PARTIAL: ◐ |
| GRADE SEPARATION                 | ○                     |
| ROAD CLOSING                     | ×                     |
| AT GRADE INTERSECTION            | ◇                     |
| RIGHT IN, RIGHT OUT INTERSECTION | ▽                     |



## HIGHWAY 404 EXTENSION

Davis Drive to Highway 12  
Route Planning Study and  
Environmental Assessment





The impacts associated with the Do Nothing alternative are primarily transportation related. Exhibit 4.23 illustrates traffic operations on the future road network under a Do Nothing scenario during commuter/weekday peak travel periods.; much of the study area road network would operate at or near capacity. Similarly, during weekend/recreational peak travel periods, the provincial highway network in the study area would generally operate at or near capacity. The Do Nothing alternative, therefore, does not provide any transportation benefits to the study area.

The impacts of a road network operating at capacity extend beyond travel time delays and increased fuel consumption. Congestion increases operating costs and reduces economic productivity. The opportunity costs of not protecting for transportation improvements to address the long-term transportation needs of the study area must also be considered. As discussed in Chapters 3, the study area is forecasted to significantly increase its residential population, while employment levels are forecasted for only moderate increases. If the development of these residential areas is permitted to occur in a manner that fails to protect for the implementation of future transportation improvements, the costs of such improvements, when required, will be greatly increased.









## 5.0 DETAILED DESCRIPTION OF UNDERTAKING

### 5.1 INTRODUCTION

This chapter provides a description of the proposed undertaking, the potential environmental impacts and resultant effects associated with the construction, operation and maintenance of the project, and the future work to be undertaken during the design phase to address environmentally significant areas and issues. Section 5.6 of this chapter provides a summary of concerns, potential effects, proposed mitigating measures and commitments to future work.

### 5.2 MAJOR FEATURES OF THE UNDERTAKING

#### 5.2.1 Conceptual Design Features

The conceptual design of the Technically Preferred Route for Highway 404 is presented schematically in Exhibit 5.1, and in greater detail in Plates 1-32 at the back of this chapter. The Highway 404 extension includes approximately 45 kilometres of controlled access divided freeway, and 9 kilometres of special controlled access highway. Two lanes in each direction, with auxiliary lanes as required, will be provided in each direction through the entire length.

The Technically Preferred Route has three different sections, each with different design characteristics, summarized in the following table:

| Section                     | Davis Drive to Weir's Road                               | Weir's Road to Durham Road 23                                       | Durham Road 23 to Highway 12  |
|-----------------------------|--|---|---|
| Design Speed (kph)          | 120  | 100   | 100   |
| Median/Basic ROW Widths (m) | 30/100*  | 7.5/80*   | 15/60*  |
| Access Designation          | Controlled   | Controlled  | Special Controlled  |
| Comments                    | Design is consistent with Hwy. 404 south of Davis Drive. | Median and ROW widths reduced to minimize impacts through Pefferlaw | Design is consistent with Hwy. 404 west of Durham Road 23 and Hwy. 12/48 proposed cross-sections. |

\* Additional property may be required beyond the basic right-of-way width-refer to Section 5.2.9

The major engineering features of the undertaking are identified in the following sections.

#### 5.2.2 Alignment

Between Davis Drive and Weir's Sideroad (west of Pefferlaw), the horizontal alignment is classified as RFD 120 (Rural Freeway Divided with design speed of 120 km/h). The freeway will have an initial cross-section of two lanes in each direction, with auxiliary lanes as required. The horizontal alignment for the proposed extension of Highway 404 contains horizontal curves with a minimum radius of 1000 metres; the minimum allowable radius for this type of facility is 650 metres.

Through Pefferlaw, the alignment is classified as RFD 100 (Rural Freeway Divided with design speed of 100 km/h). In this section, the median is reduced from 30 metres to 7.5 metres to minimize property impacts through the Pefferlaw community in the vicinity of Pefferlaw Brook. The horizontal alignment through this section has a minimum curve radius of 1100 metres; the minimum allowable radius for this type of facility is 420 metres.



The transition section between Pepperlaw and Highway 12 is classified as RAD 100 (Rural Arterial Divided with design speed of 100 km/h). On this section, the two existing lanes of Highway 48 will be twinned. The resulting section will feature two lanes in each direction separated by a 15 metre grassed median. The median provides improved safety over a non-divided section along this corridor. The 15 metre grassed median flares out to 30 metres at the Brock Concession Road 14 intersection and at the Brock Sideroad 17 intersection, to provide refuge for turning vehicles. Turning basins at these intersections will be incorporated to address safety concerns for slow-moving vehicles.

The Highway 404 transition section will have a special controlled access designation. Existing entrances will be converted to permit right in, right out access only. New entrances will not be permitted along this corridor and entrance upgrades from private to commercial will not be permitted. The intersection of Highway 48 and Highway 12 will be upgraded to an interchange.

Typical cross-sections for these three design sections are shown on Exhibit 5.2.

The vertical alignment is proposed to have a maximum grade of 3 percent. Intersecting crossroads which require vertical alignment modifications are proposed to have maximum grades of 6 percent.

### 5.2.3 Design Criteria

The following table summarizes the key design controls developed for the preferred alternative. The controls will be reviewed and may be refined during the design phase.

| Criteria          | Davis Drive to Weir's Sideroad | Weirs Sideroad to Durham Road 23 | Durham Road 23 to Highway 12 |
|-------------------|--------------------------------|----------------------------------|------------------------------|
| Min. Design Speed | 120 km/h                       | 100 km/h                         | 100 km/h                     |
| Median Width      | 30m                            | 7.5m                             | 15m                          |
| Min. Hor. Radius  | 1000m                          | 1000m                            | 1000m                        |
| Min. K-value      | 120                            | 120                              | 70                           |
| Maximum Grade     | 3%                             | 3%                               | 2.4%                         |

### 5.2.4 Road Crossings and Closings

Nine interchanges are proposed along the new facility, as indicated in Exhibit 5.1. The existing partial interchange at Davis Drive will be completed, and a partial interchange at realigned Pepperlaw Road will be constructed. Most of the crossing roads will be grade separated; four roads are proposed to be closed at the Highway 404 right-of-way.

On the section between Durham Road 23 and Highway 12, at-grade intersections will be provided at Brock Concession Road 14 and Brock 17 Sideroad (North). Access to Brock Thorah Line and Brock Sideroad 17 (South) will be provided as right-in, right-out only. Existing entrances to the highway will be maintained, but will be restricted to right in, right out access only.

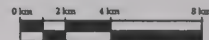
Proposed grade separations and road closing locations are illustrated on Exhibit 5.1. Exhibit 5.3 lists the proposed treatment for each road crossing and a brief rationale. Road closures were identified by the Project Team only where the crossing road was not a continuous principle road, alternate access was available within a reasonable distance of the road closure, and land uses fronting the closed road were rural residential and/or agricultural.



## TECHNICALLY PREFERRED ROUTE

### LEGEND

|                                  |           |
|----------------------------------|-----------|
| STUDY AREA LIMIT                 | -----     |
| INTERCHANGE                      | FULL ●    |
| LOCATIONS                        | PARTIAL ◐ |
| GRADE SEPARATION                 | ○         |
| ROAD CLOSING                     | ×         |
| AT GRADE INTERSECTION            | ◇         |
| RIGHT IN, RIGHT OUT INTERSECTION | ▽         |



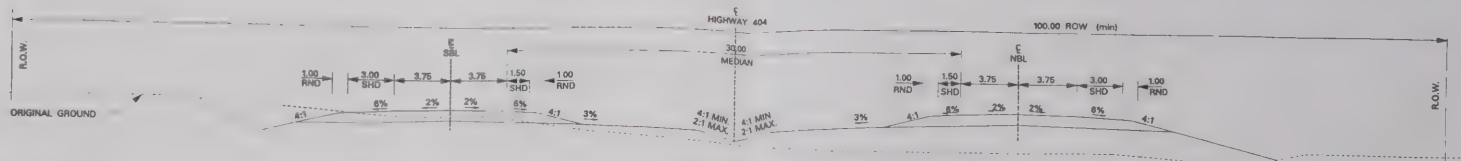
## HIGHWAY 404 EXTENSION

Davis Drive to Highway 12

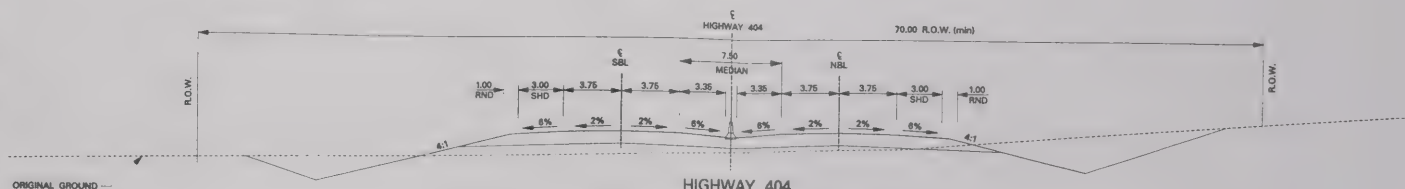
Route Planning Study and  
Environmental Assessment



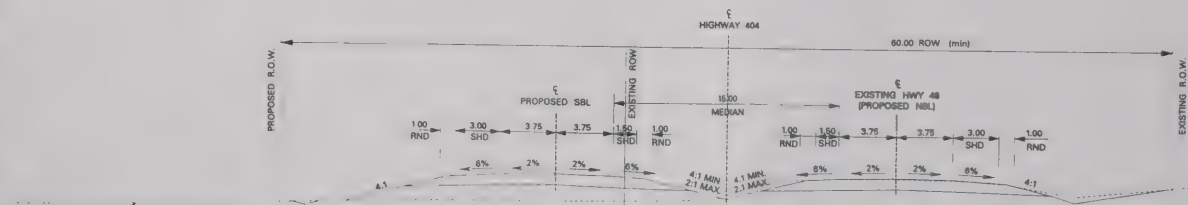




HIGHWAY 404  
DAVIS DRIVE TO WEIR'S SIDEROAD



HIGHWAY 404  
WEIR'S SIDEROAD TO DURHAM ROAD 23



HIGHWAY 404  
DURHAM ROAD 23 TO HIGHWAY 12

WHAT?

| Crossing                  | Treatment             | Rationale  |
|---------------------------|-----------------------|--|
| Stoney Batter Road        | 2 lanes over Hwy. 48  | Structure proposed to reduce out-of-way travel impacts; no reasonable alternative access available |
| Weir's Sideroad           | 2 lanes over Hwy. 404 | Continuous collector road, maintain accessibility  |
| Pefferlaw Road            | Partial Interchange   | Interchange warranted to serve community of Pefferlaw  |
| Riverbank Drive           | Service Road provided | Maintains access to lands east of Pefferlaw Brook  |
| Durham Road 23            | Interchange           | Interchange warranted due to termination of freeway; serve central Brock and western Georgina      |
| Brock Con. 14             | Intersection          | Maintain community mobility, reduce out-of-way travel  |
| Brock Thorah Line         | Right-in, right-out   | Maintain community mobility  |
| Brock Sideroad 17 (South) | Right-in, right-out   | Maintain community mobility  |
| Brock Sideroad 17 (North) | Intersection          | Maintain community mobility, reduce out-of-way travel  |
| Highway 12                | Interchange           | Interchange required to facilitate all movements at this highway-to-highway connection             |

## ROAD CROSSING TREATMENTS



| Crossing             | Treatment              | Rationale  |
|----------------------|------------------------|--|
| Herald Road          | Interchange            | Herald Road to be upgraded to serve as a bypass of Newmarket; an interchange is essential at this road connection                      |
| Mt. Albert Sideroad  | 4 lanes under 404      | East-west arterial for Sharon, topography favours underpass  |
| Farr Avenue          | Close at Hwy. 404      | Discontinuous (eastbound), alternate access to Mt. Albert Sideroad available, resulting in low out-of-way travel impacts               |
| Doane Road           | 2 lanes over Hwy. 404  | Maintain community mobility, access for agricultural lands   |
| Queensville Sideroad | Interchange            | Queensville Sideroad is a regional road providing access to communities in East Gwillimbury, including Holland Landing and Queensville |
| Holborn Road         | Closed at Hwy. 404     | Low volume local road, alternate access provided via Queensville Sideroad or Boag Road   |
| Boag Road            | 2 lanes under Hwy. 404 | Maintain community mobility, access for agricultural lands   |
| Woodbine Avenue      | Interchange            | Interchange warranted to principally serve the southern section of Keswick   |
| Ravenshoe Road       | 2 lanes over Hwy. 404  | Major arterial road  |
| Glenwoods Avenue     | Closed at Hwy. 404     | Discontinuous (westbound), alternate access to Woodbine Avenue available, resulting in low out-of-way travel impacts                   |
| Pollock Road         | Interchange            | Interchange warranted to principally serve the central and northern section of Keswick   |
| Warden Avenue        | 2 lanes over Hwy. 404  | Arterial Road, provides alternative access to Pollock Road interchange   |
| Kennedy Road         | 2 lanes over Hwy. 404  | Major arterial road  |
| Old Homestead Road   | 2 lanes over Hwy. 404  | Continuous east-west collector   |
| McCowan Road         | Closed at Hwy. 404     | Alternate access via Catering Road or Country Mile Lane  |
| Catering Road        | 2 lanes over Hwy. 404  | Connects Elm Grove to Sutton   |
| Hwy. 48              | Interchange            | Interchange warranted with this provincial highway to serve Sutton   |
| Park Road            | 2 lanes over Hwy. 404  | Continuous regional road, no reasonable alternative access available   |

## ROAD CROSSING TREATMENTS

Pefferlaw Road (York Road 21) will be realigned to the west to maintain a connection with Highway 48 (Plate 24); a partial interchange will be provided which will permit access to and from Highway 404 from the west.

A new connection to Riverbank Drive will also be constructed over the Pefferlaw Brook (Plate 24). Riverbank Drive currently intersects Highway 48 east of Pefferlaw Brook. The new connection will provide access to Highway 48 via Pefferlaw Road (York Road 21).

The proposed crossing road treatments were reviewed with municipal staff and presented to the public at the fifth series of PCSs; interchange locations were initially presented to Municipal Councils and the public at the fourth series of PCSs.

#### **5.2.5 Structures**

The proposed Highway 404 extension includes twenty grade separations at crossing roads. Bridges are proposed over major watercourses, including the Maskinonge River (two locations), the Black River and Pefferlaw Brook. Another structure is proposed over the CN Rail track, west of Durham Road 23. Conceptual span lengths are indicated on the design plates. Structural details will be determined at the next level of design.

#### **5.2.6 Property Requirements**

The majority of the property required for the Highway 404 corridor is privately owned. Approximately 1,360 hectares of property will be required along the entire length of the Highway 404 extension. The preliminary estimate includes property requirements for the highway right-of-way, and remnant properties which are either landlocked or rendered unusable for their existing use. Property purchases will be negotiated with the land owners approximately two to three years prior to construction.

#### **5.2.7 Drainage**

Roadside ditches and the centre median will be designed to accommodate highway drainage. Through Pefferlaw, where the median is reduced to 7.5 metres in width, Highway 404 will include a barrier and storm sewers.

A detailed stormwater management plan will be prepared as part of the design phase of the project. Consultation with the Ministry of Environment and Energy, Ministry of Natural Resources and the Lake Simcoe Regional Conservation Authority will be required regarding the terms of reference for a stormwater management plan study before the initiation of the design phase. The stormwater management plan will give consideration to the MOEE 1994 Stormwater Management Guidelines. The standards, policies, regulations and approval requirements in place at the time of design will govern the stormwater management provisions and approval requirements incorporated in the plan.

The objectives pertaining to stormwater management include:

- the proponent will strive to design stormwater management ponds to detain the appropriate storm event to address water quality and erosion concerns. Detention times or additional quantity sizing requirements will be considered during the design phase in consultation with stakeholders,
- when designing BMPs, consideration will be given to measures for reducing adverse environmental impacts to surface and groundwater, including those related to temperature and salt,



- bridge runoff should be discharged to stormwater management facilities (preferably a pond or swale) prior to discharge to watercourses where this reasonably can be achieved and will not cause unacceptable environmental, highway design, safety or operational problems, and
- where feasible, opportunities for providing ease of containment of accidental spills will be provided during the design of stormwater management facilities.

### 5.2.8 Operations

Projected traffic volumes for the proposed extension of Highway 404 are shown in Exhibit 5.4. Traffic volumes on the new facility are expected to be at or near capacity during peak travel times. The route will improve efficiency and reduce travel times and energy consumption of long-distance travel through the study area. Operations on the local road network will also be improved during peak travel periods, since much of the long distance traffic will be removed from these roads.

### 5.2.9 Right-of-way Requirements

The recommended basic minimum right-of-way width for the proposed highway between Davis Drive and Weir's Sideroad is 100 metres. Additional right-of-way requirements have been identified at interchanges, approaches to structures, and at areas of deep cut and fill. Between Weir's Sideroad and Durham Road 23, an 80 metre right-of-way is proposed. The 7.5 metre wide median will accommodate a median barrier to separate the directional traffic lanes.

A basic minimum right-of-way width of 60 metres is required along the twinned section of Highway 404 between Durham Road 23 and Highway 12. The existing right-of-way is 36 metres wide. Additional property will be required from adjacent properties to accommodate the new facility.

Property beyond the basic minimum right-of-way widths for the undertaking may be required for associated features, which may include, but are not limited to: stormwater management facilities, temporary construction easements, mitigation/compensation measures and access roads.

Between Davis Drive and Durham Road 23, the Highway 404 right-of-way will be a controlled access corridor, whereby access to and from the freeway will be restricted to designated interchange locations only. Crossing roads which are not proposed for interchange locations will either be grade separated (over or under Highway 404) or closed at the highway right-of-way limits.

### 5.2.10 Utilities, Railways

The proposed Highway 404 extension will require property easements at two new crossings with Ontario Hydro. The new crossings are located north of Holborn Road, and at 400m west of Durham Road 23. There is a conflict with two existing towers at the Ontario Hydro ROW crossing north of Holborn Road.

Additional property through the existing Ontario Hydro crossings south of Brock Concession Road 14, and west of Brock Sideroad 17 will be required. Tower relocation will not be required, as the existing hydro towers are located outside the proposed right-of-way.





The profile of the proposed extension considered vertical clearance requirements to existing Ontario Hydro transmission lines.

The locations of all other utility plants will be confirmed, and conflicts will be identified during design.

The proposed Highway 404 extension crosses CN Bala Subdivision west of Durham Road 23. Where an agreement can be reached with CN, no approval decision by the Canadian Transportation Agency is required (see also Section 5.3.5 - The Canadian Environmental Assessment Act). If no agreement can be reached with CN, a request for an Order to Construct will be required. Negotiations with CN will be initiated at an appropriate time to enable timely completion of the design of this portion of the highway.

#### **5.2.11 Navigable Waterways**

The Canadian Coast Guard has determined that the Pefferlaw Brook is the only navigable waterway affected by the undertaking. This crossing will require an authorization under the Navigable Waters Protection Act (see also Section 5.3.5 - The Canadian Environmental Assessment Act). This structure will be designed to avoid interfering with navigation.

#### **5.2.12 Potential Staging**

Implementation of the undertaking will take place over a number of years and reflect financial constraints and traffic demands. It is likely that the implementation of the project will be staged. This staging may include:

- Construction from Davis Drive (existing terminus);
- Construction to consist of 2 lanes per direction plus auxiliary lanes where required;
- Opening of the highway to traffic as sections become available for use;
- Staging of some interchanges and grade separations depending on traffic demands/network development. Staging of interchange ramps to provide for moves restricted to certain directions initially with others being added when traffic demands/network development warrant.

#### **5.2.13 Preliminary Cost Estimate**

Preliminary cost estimates for the extension of Highway 404 were developed based on unit costs from MTO and quantities as measured from base mapping or calculated using highway design software.

The total cost of extending Highway 404 from Davis Drive to Highway 12 includes:

- capital construction costs of the highway, including interchanges, overpasses, flyovers, etc.);
- property costs for the right-of-way;
- costs of mitigation to reduce impacts associated with the highway (e.g. additional culverts);
- engineering, contingency and appurtenance costs (typically 20% of capital construction costs).

The estimated costs of the undertaking are listed in Exhibit 5.5.

| SEGMENT | TERMINUS                                 | LENGTH<br>km | CONSTRUCTION COST | ENG'G & CONTINGENCY (20%) | PROPERTY COST | TOTAL COST    |
|---------|--|--------------|-------------------|---------------------------|---------------|---------------|
| 1       | Herald Road                              | 2.5          | \$8,800,000       | \$1,760,000               | \$410,000     | \$11,000,000  |
| 2       | Queensville Sideroad                     | 8.5          | \$25,600,000      | \$5,120,000               | \$1,700,000   | \$32,400,000  |
| 3       | Ravenshoe Road<br>(Woodbine Interchange) | 5            | \$14,400,000      | \$2,880,000               | \$1,910,000   | \$19,200,000  |
| 4       | Pollock Road                             | 5.5          | \$22,800,000      | \$4,560,000               | \$1,370,000   | \$28,700,000  |
| 5       | Highway 48 (Sutton)                      | 9.5          | \$38,200,000      | \$7,640,000               | \$3,640,000   | \$49,500,000  |
| 6       | Durham Road 23 (Port Bolster)            | 14           | \$49,800,000      | \$9,960,000               | \$7,630,000   | \$67,400,000  |
| 7       | Highway 12                               | 9            | \$10,600,000      | \$2,120,000               | \$520,000     | \$13,200,000  |
| TOTALS  |  | 54           | \$170,200,000     | \$34,040,000              | \$17,180,000  | \$221,400,000 |

**Notes:**

1. COSTS ARE BASED ON UNIT PRICES SUPPLIED BY MTO (REFER TO APPENDIX 2) AND QUANTITIES TAKEN FROM 1:10 000 SCALE PLANS.

2. LIMITS OF SEGMENTS WERE ASSUMED FOR COSTING PURPOSES ONLY; CONSTRUCTION STAGING LIMITS WILL REFLECT FINANCIAL CONSTRAINTS AND TRAFFIC DEMAND.



#### **5.2.14 Adjacent Projects**

Three road projects are currently in progress which connect to the proposed Highway 404 extension.

*Green Lane/Herald Road Corridor Improvements Study* by York Region incorporates an interchange with Herald Road and Highway 404. The interchange has been designed to accommodate the proposed improved Herald Road (Plate 2). In addition, the profile and grading of Highway 404 between Davis Drive and Herald Road reflect the requirements for the Herald Road improvements.

The *Green Lane/Herald Road Corridor Improvements Study* also incorporates a staging scenario which involves constructing two lanes of Highway 404 to Herald Road, with a partial interchange at Herald Road. This staging is compatible with the design proposed for the interchange at Herald Road. When required, the remaining two lanes and a median can be constructed, and the interchange at Herald Road can be completed without requiring additional property in the area.

The *Bradford Bypass Study* by MTO incorporates an east-west controlled access highway connecting Highway 400 and Highway 404, including an interchange with Highway 404 north of Queensville. The two projects are compatible in that they are both freeway facilities connected by an fully directional interchange.

The Bradford Bypass interchange (Plate 6) with Highway 404 will require realignment of the ramps proposed for the Queensville Sideroad interchange. These realignments will not significantly alter traffic operations at the Queensville Sideroad interchange.

The *Highway 12/48 Improvements Study* by MTO is developing corridor improvements for Highway 12/48 to address the short- to mid-term operational needs. Alternatives being considered include widening Highway 12/48 to four lanes.

This project is compatible with the Highway 404 Extension in that both studies are recommending improvements to capacity of an existing highway corridor. Both studies were coordinated to ensure compatible cross-sections (Plates 31 and 32).

### **5.3 STAKEHOLDER CONSULTATION DURING DESIGN STAGES**

#### **5.3.1 Stakeholder Participation**

The MTO is committed to involving affected stakeholders in the design process to ensure that the Highway is designed and constructed in a way that is responsive to these stakeholders' interests.

Since the detail design has not commenced, there is ample opportunity for meaningful stakeholder input. The following sets out the proposed consultation process.

#### **The External Group**

The external group consists of the technical agencies having expressed an interest in ongoing involvement with the Highway 404 Extension project. They have been involved through the planning of this project and will continue to be kept informed and consulted during the design and construction phases, through correspondence and meetings as issues that are relevant to specific agency mandated concerns arise.

## **Municipal Involvement**

Throughout the planning of this undertaking municipal staff and elected officials have been involved. During the design and construction phases, municipal staff will be consulted on an ongoing basis as issues arise.

## **Public Consultation**

The public has been kept informed of the progress of this project and has influenced the planning of the undertaking. In order to keep the public informed through the design phase and allow for public input, public consultation sessions will be held during the design phase.

### **5.3.2 The Design Process**

The design is usually carried out in two phases – preliminary design and detail design. These two phases have traditionally followed one after the other. However, they may be combined as an evolving process to accelerate design and construction. Since construction may occur over several years, design of the portion of the undertaking that will be constructed in a subsequent year may be done while previous portions are being constructed.

## **Environmental Protection Objectives**

Although the specifics of the objectives for protecting the environment will be refined during the design phase in consultation with external agencies and municipalities, Section 5.4 describes the environmental issues that have been identified thus far during the consultation process for this study, as well as the mitigation measures which will address these issues. These have been developed in consultation with affected agencies.

## **Design**

Early in the design phase the design concepts are developed – addressing issues, such as roadway cross-section, general structural arrangement, structure types, spans, clearances, pier placements, site access, vertical and horizontal grades, interchange placement and configuration, and preliminary stormwater management plans. The design plates at the end of this chapter provide a starting point in that respect. In addition, property acquisition and archaeological and built heritage mitigation activities will be started, if required, and geotechnical surveys will be carried out.

At the start of the design of each watercourse crossing, meetings will be held to discuss each agency's objectives with respect to the crossing. To facilitate these discussions, a table summarizing the potential effects and other issues related to the affected environment will be completed. This step is critical to ensuring that the design team and stakeholders have a common understanding of the issues, constraints and goals to be addressed by the design. The information to be considered includes stream habitat classification and type at the crossing locations, habitat sensitivity level for fish at the crossing; system sensitivity downstream of the crossing location; stormwater management sensitivities at the crossing (including storage and passage of flood flows, water quality and erosion control); other environmental conditions (e.g. terrestrial habitat and corridors, groundwater conditions, public access, and Environmentally Significant Area features and functions); and engineering design constraints.

Alternative design concepts will be developed and evaluated on the basis of issues, including environmental impacts, ability to mitigate environmental effects, transportation objectives, engineering requirements, constructability, and cost. A preferred design concept will be developed/refined in consultation with the stakeholders.



During this phase, initial mitigating measures and fishery habitat compensation plans (where required) will be developed in consultation with stakeholders. As well, the need for and nature of follow-up monitoring will be determined in consultation with:

- Ontario Ministry of Natural Resources (MNR)
- Ontario Ministry of Environment and Energy (MOEE)
- Canada Department of Fisheries and Oceans (DFO)
- Canada Department of the Environment (DOE)
- Lake Simcoe Region Conservation Authority (LSRCA)

Again, ongoing consultation will ensure that, as the details of the design are refined, agency concerns continue to be addressed.

### **5.3.3 Documentation of the Design Phase**

When the design of a component of the undertaking has been completed, the specific commitments to environmental protection measures, ongoing consultation and follow-up monitoring will be documented in a "Design and Construction Report" and made available to the stakeholders for review and comment prior to the commencement of construction.

### **5.3.4 Construction Phase**

Prior to construction, construction plans will be prepared to ensure that construction is carried out in accordance with the agreement reached during the design phase. This includes the implementation of environmental protection measures, restoration and/or compensation plans. Copies of construction plans will be made available to stakeholders for review and comment, prior to commencement of construction.

### **5.3.5 The Canadian Environmental Assessment Act**

The Canadian Environmental Assessment Act (CEAA) requires that a CEAA approval be obtained for those projects requiring federal lands, federal funding, or specified federal approvals. The Highway 404 Extension project is expected to trigger CEAA because of three types of federal approvals. The review carried out under CEAA will be a Screening of the environmental effects, including cumulative effects, associated with the specific activities that trigger the Act.

During the design phase application will be made for federal approvals under the Navigable Water Protection Act (NWP) for the Pefferlaw Brook crossing and, potentially, the Canadian Transportation Act (CTA) for the crossing of CN's Bala Subdivision. Where required, these applications will be accompanied by suitable environmental and design reports that provide the necessary environmental information to conduct a screening under the Canadian Environmental Assessment Act (CEAA). In addition, where it is determined by MNR that harmful alteration of fish habitat will occur, authorization under the Federal Fisheries Act will be required. Issuance of this authorization also triggers CEAA. The potential Federal Approvals include the following:

#### **The Crossing of the Pefferlaw Brook**

The Canadian Coast Guard has determined that the Pefferlaw Brook is the only navigable waterway affected by the undertaking. This crossing will require an authorization under the Navigable Waters Protection Act. This authorization is a trigger under CEAA and therefore a CEAA Screening will be required. The Canadian Coast Guard will be the Lead Responsible Authority for this screening. At the time of application for NWP approval, design and environmental impact and mitigation information will be provided so that both a CEAA Screening and the issuance of the NWP Approval can be completed.



## **The Crossing of the CN – Bala Subdivision**

As noted in Section 5.2.10, the proposed Highway 404 extension crosses the CN Bala Subdivision west of Durham Road 23. Where an agreement can be reached with the rail line's owner, no approval decision by the CTA is required and, therefore, there is no CEAA trigger. If however, an agreement cannot be reached, a decision will be required from the Canadian Transportation Agency. The requirement for this authorization triggers a CEAA Screening. Because the CEAA Screening cannot be done until a request for an "Order to Construct" is made, and because the request for the Order must contain design information, the actual CEAA Screening must wait until the design information can be provided. The CTA can do a screening and issue a preliminary "Order to Construct" on the condition that more detailed design information is provided for their approval before construction begins. Therefore, a design and construction report may need to accompany the application for an "Order to Construct", addressing the specific environmental assessment requirements, as specified in the CTA's Environmental Assessment Guide.

## **Department of Fisheries and Oceans**

Under the Fisheries Protocol, signed between the MTO and the MNR, the first point of contact to address fisheries issues is with the MNR. It is only in those situations where MNR concludes that harmful alteration of fish habitat will occur, that an authorization from the Department of Fisheries and Oceans (DFO) is required. Upon referral of a water crossing project to DFO for Authorization under the Fisheries Act, DFO will determine if an Authorization may be issued on the basis of the information provided and the mitigation and compensation measures proposed. Once a decision to issue an Authorization is made, the requirement for a CEAA Screening is triggered. A detailed assessment of the stream, crossings will be carried out during the design phase of the study. This analysis will be presented in a supplemental report that will be submitted with a joint proponent/MNR letter of intent, to DFO in support of the request for Authorization and the CEAA Screening. This report will be prepared in consultation with MNR, LSRCA, DFO and DOE, and will address the detailed impact and mitigation measures, including any required mitigation and fisheries compensation.

## **5.4 ENVIRONMENTAL ISSUES AND COMMITMENTS**

**Note to Reviewers:** The factors, criteria and indicators, as well as the specific measures used to assess impacts for each indicator used in the analysis and evaluation represent the most appropriate set of measurements to identify and assess the impacts associated with this project. This section discusses the impacts, issues and commitments raised over the course of this project, some of which are inherent in large-scale transportation planning projects like this one, while others reflect the uniqueness of the study area.

### **5.4.1 Transportation**

#### **5.4.1.1 Traffic Operations**

The proposed extension will improve efficiency for long-distance travel through the study area. The facility will provide for high-speed non-stop travel on a continuous facility. The new facility will also increase roadway capacity to sufficiently accommodate daily traffic demand, as well as seasonal peaks, temporary traffic reductions, peak recreational traffic demand and diverted traffic from congested alternate routes.

To be effective in improving transportation efficiency, the extension must be implemented in accordance with traffic demand. Traffic volumes will continue to be

monitored on existing provincial and municipal roads. Staging for the new facility will be considered once approval for the Undertaking is received.

#### **5.4.1.2 Network Compatibility**

The proposed extension of Highway 404 will greatly improve traffic operations on much of the study area road network. By diverting the long-distance traffic from the municipal road network, traffic operations on these roads will be improved. Grade separations at most of the crossing roads will reduce impacts to the local road network.

The proposed facility will extend the existing provincial freeway system serving south-central Ontario. In addition, the Highway 404 extension is compatible with the future study area road network which, once implemented, will further improve operations in and around the study area.

To be effective in improving operations on the road network, the extension must be implemented in accordance with traffic demand. Traffic volumes will continue to be monitored on existing provincial and municipal roads. Staging for the new facility will be considered once approval for the Undertaking is received.

#### **5.4.1.3 Cost**

The estimated cost of the new facility will be amortized over many years. Construction can be staged so as to further spread these costs over several years. In return, this infrastructure project will generate jobs during construction and produce travel time savings and other economic benefits for many years thereafter.

During the next design phases, options for cost-efficiencies through design improvements will be investigated. The cost-effective designs should satisfy the transportation needs of the Highway 404 extension and consider the full range of impacts.

### **5.4.2 Natural Environment**

#### **5.4.2.1 Fisheries**

Fish sampling was conducted in all watercourses and roadside ditches crossed by the Technically Preferred Route to address potential seasonal use of these areas by fish from larger downstream systems, including Lake Simcoe. Details of this sampling process are included in Appendix 3.

The development of Highway 404 will have a number of effects on the aquatic environment through both the construction and operations phases of the highway development. Many of these potential impacts cannot be assessed in detail at this time given the level of design that is available for the Technically Preferred Route. Certain mitigation measures were applied in the siting process to reduce the potential for watercourse alterations both at the crossing and as a result of morphological adjustments to compensate for channel alterations. To the extent possible, all crossings were aligned perpendicular to the channel and on straight sections to reduce alterations. Groundwater impacts and mitigation are discussed in Section 5.4.2.5. Several of the watercourses along the Technically Preferred Route are associated with wetland environments. These watercourses may not have exhibited a strong significance for fish but may be significant for the wetland functions. Vegetation and wetlands have been discussed separately in Sections 5.4.2.2 and 5.4.2.3, respectively.



Based on past experience, MTO has developed a set of standard mitigation and design practices which address many of the impacts of highway development. When applied appropriately and maintained, they can effectively reduce or eliminate the impact. Examples of such standard practices include:

- a) stormwater management through the use of best management practices, including sedimentation facilities where appropriate to treat the drainage from the highway;
- b) the requirement for sediment and erosion control plans including details of implementation, monitoring and maintenance;
- c) hydraulic analyses of culverts to ensure that the flood risks are minimized;
- d) increased use of low flow channels in culverts to maintain channel form and function where appropriate;
- e) restoration of disturbed natural areas through the inclusion of planting plans, particularly focused on slopes and riparian edge treatments;
- f) the use of timing restrictions to reduce conflicts with fish spawning periods; and
- g) increased awareness of the maintenance of groundwater flow and pattern through the use of open bottom culverts, and cut off walls, as appropriate.

For this project we have assumed that these, or other more progressive, standard practices, would be used to mitigate the impacts expected. When more detail is available on the design being proposed for the highway, the need for these measures can be assessed. At this time, we have assessed the preliminary route alignment and made broad assumptions about the crossing types. Bridged crossings have been assessed on the basis of an estimated structure span. Concrete box culverts have been assumed at other crossings unless otherwise specified. A right of way width of 100 m forms the basis for the assessment, however, in most cases the actual area of impact may be significantly less depending on the adjacent lands and embankments required. The impact assessment provided in this section has concentrated on assessing the physical alterations to fish habitat that would be expected from an undertaking such as this, and the implications for Federal Fisheries Act application to the crossing. We have used the rationale of the MTO Environmental Manual Fisheries (1994) when assessing whether a given crossing is likely to result in a harmful alteration and thus require compensation as provided for in the Policy for the Management of Fish Habitat (DFO 1986).

The Environmental Manual - Fisheries (MTO 1994) provides an assessment of fish habitat functions of a waterbody in order of increasing ability to implement mitigation. Fish habitat functions include spawning, rearing/nursery, resting, refuge, food production, passage, and baseflow conveyance. Of these, spawning and nursery habitats are often considered to be the most limiting in an environment and typically the most sensitive to disturbance. Often these habitats rely on specialized substrates or flow conditions which are difficult to replicate through restoration, or in the crossing structure. This is particularly true for game species but may not hold true for forage species, many of which take advantage of temporary waters and variable habitats to complete their life cycle. Brook sticklebacks are an example of such a species which may spawn in temporary waters, but this species are not considered to be significant or sensitive. Refuge habitats and flow conveyance are functions that can be maintained within a structure and, as function can be maintained in the face of a new crossing, we typically consider that there would be no harmful alteration to these types of habitats. Often, culverts provide refuge habitat where previously none existed by virtue of the installation which tends to result in deeper pockets of water at the inlet and outlet.



The impacts that the construction of the Highway 404 extension is expected to have on the existing aquatic habitat features were classified into eight categories based on the existing aquatic habitat conditions, as outlined on the table shown on the following page.

A short description of the various impacts that the new highway will have on the aquatic habitat is discussed below. Site specific impacts are outlined for each crossing on Exhibit 5.6 (For the location of each aquatic unit, refer to plates included in Appendix 3.).

Twenty-seven of the 66 crossings are not considered fish habitat and would, therefore, not be impacted by the preferred route of Highway 404. These crossings are typically dry roadside ditches, cattail choked channels or swales that convey agricultural drainage seasonally. While these crossings may contain water at times throughout the year, the water is not retained long enough or in a channel with sufficient form to provide habitat for fish. A further 18 crossings had poor habitat, 10 were considered to have moderate habitat and 11 had good habitat.

Impacts were assessed on 67 crossings as one location (LS2) had impacts to both a pond and a watercourse to differing levels.

| Habitat Conditions                     | Impact        | Rationale   |
|--|---------------|---|
| no habitat                             | NONE          | <ul style="list-style-type: none"> <li>no loss</li> </ul>   |
| poor habitat with existing culvert     | LOW           | <ul style="list-style-type: none"> <li>alterations have occurred</li> <li>minimal impact</li> <li>function of the channel will be maintained</li> </ul> |
| poor habitat                           | LOW           | <ul style="list-style-type: none"> <li>minimal impact</li> <li>function of the channel will be maintained</li> </ul>                                    |
| moderate habitat with existing culvert | MODERATE      | <ul style="list-style-type: none"> <li>alterations have occurred</li> <li>some functions of the channel may be altered</li> </ul>                       |
| moderate habitat                       | MODERATE-HIGH | <ul style="list-style-type: none"> <li>no previous alteration</li> <li>some functions of the channel may be altered</li> </ul>                          |
| good habitat with existing culvert     | MODERATE-HIGH | <ul style="list-style-type: none"> <li>alterations have occurred</li> <li>some functions of the existing channel may be lost</li> </ul>                 |
| good habitat                           | HIGH          | <ul style="list-style-type: none"> <li>no previous alteration</li> <li>some functions of the channel may be lost</li> </ul>                             |
| good habitat to be bridged             | LOW           | <ul style="list-style-type: none"> <li>no alterations to channel expected</li> <li>bridge footings are kept out of the channel</li> </ul>               |

The highway is considered to have a low impact on a total of 28 crossings. Seven (7) of these crossings are drainage channels which connect wetlands through equalizer culverts under Highway 48. These channels were observed to be choked with cattails and were assessed as providing poor habitat for fish. The primary function of these channels is conveyance of water to equalize depths on either side of the highway. Twelve (12) crossings included in this category are the seasonal channels that convey surface drainage in the spring and early summer. At the time of sampling no fish, water or refuge were present. These channels are considered to have poor habitat for fish as they have only a slight flow, weak connections to drainage systems and are typically choked with vegetation. These channels are considered unlikely to offer migratory routes for early spring spawning species.

| Map # | Chainage | Unit # | Drainage System                               | Existing Conditions at Crossing   | Channel Dimensions (m)<br>Width Depth | Potential Impact/Habitat Loss  | Fisheries Mitigation  | Net Effect   |
|-------|----------|--------|---|---|---------------------------------------|--|---|--|
| 3     | 150+350  | GH1    | Gibson Hill Swamp                             | -no flow (<5 cm water), no connection to flowing system<br>-grass lined road ditch (channel not found)<br>-no fish habitat  | -                                     | -no fish habitat loss<br>-no impact  | -none required  | -no harmful alteration<br>-no compensation required  |
| 3     | 150+175  | GH2    | Gibson Hill Swamp                             | -moderate flow from artificial pond to road ditch to stream<br>-no connection to flowing system (stream buried downstream)<br>-no instream cover, no canopy<br>-poor fish habitat in road ditch, moderate habitat in pond | 0.80                                  | -fill pond, loss of artificial pond habitat (spawning, feeding, refuge, habitat for warm water species), subsequent loss of ditch flow - artificial<br>-low impact | -none required  | -loss of artificial pond and road ditch habitat<br>-no harmful alteration<br>-no compensation required                                       |
| 3     | 149+450  | GH3    | Gibson Hill Swamp<br>(natural areas stn. 44)  | -dry, swale, steep grassy slope<br>-no connection to flowing system<br>-no fish habitat   | -                                     | -no fish habitat loss<br>-no impact  | -none required  | -no harmful alteration<br>-no compensation required  |
| 3     | 149+300  | GH4    | Gibson Hill Swamp<br>(natural areas stn. 44)  | -minimal flow under Hwy 48 (south), channel choked with cattails, culvert connection between wetlands<br>-poor fish habitat   | 1.00                                  | -60 m alteration of drainage channel presently connecting wetlands<br>-low impact  | -cultvert extension; to maintain fish passage opportunity and conveyance function | -no harmful alteration<br>-no compensation required  |
| 3     | 149+000  | GH5    | Gibson Hill Swamp<br>(natural areas stn. 44)  | -minimal flow under Hwy 48 (south) into treed swamp<br>-channels choked with cattails and algae<br>-poor fish habitat   | 1.00                                  | -60 m alteration of drainage channel presently connecting wetlands<br>-low impact  | -cultvert extension; to maintain fish passage opportunity and conveyance function | -no harmful alteration<br>-no compensation required  |
| 3     | 148+760  | GH6    | Gibson Hill Swamp<br>(natural areas stn. 44)  | -minimal flow under Hwy 48 (south), no channel present<br>-culvert connection between wetlands, dense cattails<br>-poor fish habitat  | 1.00                                  | -60 m alteration of drainage channel presently connecting wetlands<br>-low impact  | -cultvert extension; to maintain fish passage opportunity and conveyance function | -no harmful alteration<br>-no compensation required  |
| 3     | 148+400  | GH7    | Gibson Hill Swamp<br>(natural areas stn. 44)  | -dry, culvert connection between cattail swamp and low lying grassy area<br>-no fish habitat  | -                                     | -no fish habitat loss<br>-no impact  | -none required  | -no harmful alteration<br>-no compensation required  |
| 3     | 147+750  | PS1    | Port Bolster Swamp<br>(natural areas stn. 43) | -no flow, poor connection through ditches, connected to treed swamp (north)<br>-poor fish habitat   | 0.70                                  | -60 m alteration of drainage channel presently connecting wetlands<br>-low impact  | -cultvert extension; to maintain fish passage opportunity and conveyance function | -no harmful alteration<br>-no compensation required  |
| 3     | 147+275  | PS2    | Port Bolster Swamp<br>(natural areas stn. 43) | -northward flow from dense cattails into dense cattails, culvert connection between wetlands<br>-poor fish habitat  | 1.00                                  | -60 m alteration of drainage channel presently connecting wetlands<br>-low impact  | -cultvert extension; to maintain fish passage opportunity and conveyance function | -no harmful alteration<br>-no compensation required  |
| 3     | 146+825  | PS3    | Port Bolster Swamp<br>(natural areas stn. 43) | -minimal flow, culvert connection between wetlands<br>-channels with grasses and cattails<br>-poor fish habitat   | 1.00                                  | -60 m alteration of drainage channel presently connecting wetlands<br>-low impact  | -cultvert extension; to maintain fish passage opportunity and conveyance function | -no harmful alteration<br>-no compensation required  |
| 3     | 146+200  | PS4    | Port Bolster Swamp<br>(natural areas stn. 43) | -minimal flow, culvert connection between wetlands<br>-channel with grasses and cattails<br>-poor fish habitat  | 1.00                                  | -60 m alteration of drainage channel presently connecting wetlands<br>-low impact  | -cultvert extension; to maintain fish passage opportunity and conveyance function | -no harmful alteration<br>-no compensation required  |
| 3     | 145+975  | PS5    | Port Bolster Swamp<br>(natural areas stn. 43) | -dry to soggy ditches<br>-no connection to adjacent pond or flowing system<br>-no fish habitat  | -                                     | -no fish habitat loss<br>-no impact  | -none required  | -no harmful alteration<br>-no compensation required  |
| 3     | 145+450  | RD1    | Road Drainage                                 | -dry, grassy slope (no ditch) on north side<br>-soggy, cattail swamp on south side<br>-no fish habitat  | -                                     | -no fish habitat loss<br>-no impact  | -none required  | -no harmful alteration<br>-no compensation required  |
| 3     | 145+150  | RD2    | Road Drainage                                 | -dry cattail swamp (some grasses) with no ditch or channel<br>-no fish habitat  | -                                     | -no fish habitat loss<br>-no impact  | -none required  | -no harmful alteration<br>-no compensation required  |
| 3     | 143+600  | LS1    | Lake Simcoe                                   | -no connection between pond and field drainage<br>-no drainage channel, dry, grassy slope<br>-no fish habitat   | -                                     | -no fish habitat loss<br>-no impact  | -none required  | -no harmful alteration<br>-no compensation required  |
| 3     | 143+350  | LS2    | Lake Simcoe                                   | -channel filling in with grass, moss, algae<br>-no connection with adjacent farm pond, moderate flow towards LSS (connected to Lake Simcoe)<br>-moderate fish habitat   | 1.50                                  | -fish habitat alteration - potential minnow spawning<br>-low impact<br>-pond habitat loss (approx. half, artificial pond)<br>-moderate impact                      | -cultvert to maintain fish passage opportunity and base flow                      | -loss of portion of pond habitat and minnow spawning habitat (instream vegetation)<br>-compensation likely; confirm at detailed design stage |
| 3     | 143+050  | LS3    | Lake Simcoe                                   | -cattail filled basin, connection to LSS via channel with dense cattails (light flow)<br>-poor fish habitat   | -                                     | -loss of cattail wetland habitat (fill 12% of basin)<br>-potential reduction of downstream flow into LSS<br>-low impact  | -none available   | -no harmful alteration<br>-no compensation required  |

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- Length required to be confirmed at detail design stage
- Species use to be confirmed at detail design stage
- Confirm design at detail design stage



| Chainage | Unit # | Drainage System                             | Existing Conditions at Crossing   | Channel Dimensions (m)<br>Width Depth | Potential Impact/Habitat Loss  | Fisheries Mitigation   | Net Effect   |
|----------|--------|---|---|---------------------------------------|--|--|--|
| 142+600  | LS4    | Lake Simcoe                                 | -connection to creek through a small pipe draining a small, artificial pond in works yard<br><b>-no fish habitat</b>                        | --                                    | -no fish habitat loss<br><b>-no impact</b>   | -none required   | -no harmful alteration<br>-no compensation required  |
| 142+450  | LS5    | Lake Simcoe                                 | -good flow, well defined channel, cobble, gravel bottom, good canopy, connection to Lake Simcoe<br><b>-good fish habitat</b>                | 1 00 0.25                             | -100 m alteration of fish habitat (feeding/refugia habitat migratory route for warm water species, potential pickerel spawning)<br><b>-high impact</b>                             | -open bottom culvert to maintain low flow channel, fish migration, refugia habitat | -loss of feeding/refugia and pickerel spawning habitat<br>-compensation likely required; confirm at detailed design stage            |
| 141+900  | PB1    | Pefferlaw Brook                             | -channel does not exist<br><b>-no fish habitat</b>  | --                                    | -no fish habitat loss<br><b>-no impact</b>   | -none required   | -no harmful alteration<br>-no compensation required  |
| 141+500  | PB2    | Pefferlaw Brook                             | -slow flow, well vegetated channel flowing welland connected to Pefferlaw Brook embayment via small stream<br><b>-moderate fish habitat</b> | 2 50 0.25                             | -50 m alteration of fish habitat (minnow spawning, feeding, refugia)<br><b>-low impact</b>   | -enclose area under Pefferlaw Brook and embayment bridge.                          | -no harmful alteration<br>-no compensation required if mitigated as proposed; confirm at detailed design stage                       |
| 141+450  | PB3    | Pefferlaw Brook (natural areas sin. 41)     | -permanent flow, main branch, connection to Lake Simcoe channelized at route crossing, deep run, no canopy<br><b>-good fish habitat</b>     | 100.00 (including embayment)          | -100 m crossing warm water river habitat<br><b>-moderate impact</b>  | -bridge, minimize piers instream   | -potential loss of river bed<br>-compensation may be required, confirm at detail design stage  |
| 141+325  | PB4    | Pefferlaw Brook                             | -connection with Pefferlaw Brook, dry channel<br><b>-no fish habitat</b>  | --                                    | -no fish habitat loss<br><b>-no impact</b>   | -none required   | -no harmful alteration<br>-no compensation required  |
| 141+225  | RD3    | Road Drainage                               | -dry to soggy road ditch, connection with PB4 choked with cattails and grasses, steep<br><b>-no fish habitat</b>                            | --                                    | -no fish habitat loss<br><b>-no impact</b>   | -none required   | -no harmful alteration<br>-no compensation required  |
| 141+150  | RD4    | Road Drainage                               | -dry with pockets of standing water in road ditch -connection with PB4 via culvert<br><b>-no fish habitat</b>                               | --                                    | -no fish habitat loss<br><b>-no impact</b>   | -none required   | -no harmful alteration<br>-no compensation required  |
| 140+725  | LS6    | Lake Simcoe (natural areas sin. 40)         | -slight flow, weak connection to Lake Simcoe grass lined channel, no authorization to sample<br><b>-poor fish habitat</b>                   | 1 00 0.05-0.10                        | -100 m alteration of ephemeral watercourse that conveys field drainage<br><b>-low impact</b>   | -culvert to maintain fish passage opportunities and conveyance function            | -no harmful alteration<br>-no compensation required  |
| 140+400  | LS7    | Lake Simcoe (natural areas sin. 40)         | -non-continuous flow through poorly defined channel, weak connection to Lake Simcoe, organic substrate<br><b>-poor fish habitat</b>         | 0.80 <0.05                            | -100 m alteration of watercourse (no fish present)<br><b>-low impact</b>   | -culvert to maintain fish passage opportunities and conveyance function            | -no harmful alteration<br>-no compensation required  |
| 140+275  | LS8    | Lake Simcoe (natural areas sin. 40)         | -no flow, poorly defined channel, very organic substrate -weak connection to LS7 system<br><b>-poor fish habitat</b>                        | 2 00-3 00 --                          | -100 m alteration of low lying, wet channel (no fish present)<br><b>-low impact</b>  | -culvert to maintain fish passage opportunities and conveyance function            | -no harmful alteration<br>-no compensation required  |
| 139+750  | MC1    | Morning Glory Creek (natural areas sin. 38) | -no flow, weak connection to Morning Glory Creek -poorly defined channel, organic substrate<br><b>-poor fish habitat</b>                    | --                                    | -100 m alteration of low lying, wet channel (no fish present)<br><b>-low impact</b>  | -culvert to maintain fish passage opportunities and conveyance function            | -no harmful alteration<br>-no compensation required  |
| 139+625  | MC2    | Morning Glory Creek (natural areas sin. 38) | -channel does not exist - no fish habitat -nearby pond contributes to system downstream of MC1<br><b>-good fish habitat (pond)</b>          | --                                    | -loss of permanent/artificial pond (spawning, feeding, refugia habitat), outflow channel and flow contribution to Morning Glory Creek<br><b>-moderate to high impact (to pond)</b> | -fill pond with permeable material to maintain groundwater flow-through to channel | -loss of artificial pond habitat<br>-no compensation required  |
| 139+550  | MC3    | Morning Glory Creek (natural areas sin. 38) | -dry road ditch -no connection to Morning Glory Creek system<br><b>-no fish habitat</b>   | --                                    | -no fish habitat loss<br><b>-no impact</b>   | -none required   | -no harmful alteration<br>-no compensation required  |
| 139+250  | MC4    | Morning Glory Creek (natural areas sin. 38) | -permanent flow, 2nd order stream, well defined channel, low grade, potential cold water stream<br><b>-good fish habitat</b>                | 3 00-4 00 0.20-0.40                   | ->100 m alteration of potential cold water habitat with meander<br><b>-high impact</b>   | -open bottom culvert to maintain ground water potential and low flow channel       | -net loss to be determined<br>-compensation likely required, confirm at detailed design stage  |
| 137+325  | LS9    | Lake Simcoe (natural areas sin. 35)         | -good flow, well defined, slightly entrenched channel -clay bottom<br><b>-good fish habitat</b>   | 1 20 0.36                             | -100 m alteration of fish habitat (migratory route feeding, refugia habitat for warm water species)<br><b>-high impact</b>   | -culvert to maintain feeding habitat, fish migration and low flow channel          | -loss of refugia habitat (undercut banks and overhanging grasses)<br>-compensation likely required, confirm at detailed design stage |
| 134+525  | LS10   | Lake Simcoe (natural areas sin. 33)         | -dry channel that conveys agricultural drainage<br><b>-no fish habitat</b>  | --                                    | -no fish habitat loss<br><b>-no impact</b>   | -none required   | -no harmful alteration<br>-no compensation required  |

1. Habitat loss is based on 100m width ROW; actual area of loss to be confirmed at detail design stage  
2. Length required to be confirmed at detail design stage  
3. Species use to be confirmed at detail design stage  
4. Confirm design at detail design stage



| Chainage Unit # | Drainage System                                    | Existing Conditions at Crossing  | Channel Dimensions (m) |           | Potential Impact/Habitat Loss.   | Fisheries Mitigation  | Net Effect   |
|-----------------|--|--|------------------------|-----------|--|---|--|
|                 |  |  | Width                  | Depth     |  |   |  |
| 134+400         | LS11<br>Lake Simcoe<br>(natural areas sin. 33)     | -dry channel that conveys agricultural drainage<br>-no fish habitat  | --                     | --        | -no fish habitat loss<br>-no impact  | -none required  | -no harmful alteration<br>-no compensation required  |
| 134+100         | LS12<br>Lake Simcoe<br>(natural areas sin. 33)     | -dry channel that conveys agricultural drainage<br>-no fish habitat  | --                     | --        | -no fish habitat loss<br>-no impact  | -none required  | -no harmful alteration<br>-no compensation required  |
| 133+350         | LS13<br>Lake Simcoe<br>(natural areas sin. 33)     | -dry channel that conveys agricultural drainage<br>-no fish habitat  | --                     | --        | -no fish habitat loss<br>-no impact  | -none required  | -no harmful alteration<br>-no compensation required  |
| 133+175         | LS14<br>Lake Simcoe<br>(natural areas sin. 33)     | -slow flow, moderately defined channel<br>-low lying, grass lined, organic bottom<br>-moderate fish habitat  | 1.50                   | 0.25      | -100 m alteration of fish habitat (feeding, refugia for warm water species, migratory route)<br>-moderate to high impact   | -culvert to maintain feeding habitat, fish migration and low flow channel<br>-none required | -loss of refugia habitat (grass/algae/shrubs)<br>-compensation likely required; confirm at detailed design stage |
| 132+500         | RD5<br>Road Drainage                               | -dry, grassed channel<br>-no fish habitat  | --                     | --        | -no fish habitat loss<br>-no impact  | -none required  | -no harmful alteration<br>-no compensation required  |
| 130+075         | RD6<br>Road Drainage                               | -dry channel; no connection with Black River<br>-no fish habitat   | --                     | --        | -no fish habitat loss<br>-no impact  | -none required  | -no harmful alteration<br>-no compensation required  |
| 129+850         | RD7<br>Road Drainage                               | -dry, grassed road ditch<br>-no connection to Black River<br>-no fish habitat  | --                     | --        | -no fish habitat loss<br>-no impact  | -none required  | -no harmful alteration<br>-no compensation required  |
| 129+075         | BR1<br>Black River<br>(natural areas sin. 29)      | -permanent flow to Lake Simcoe but Sulton Dam barrier to fish migration (main branch of Black River), deep, well defined channel<br>-limited pike spawning potential (isolated pockets of suitable habitat)<br>-good fish habitat  | >20.00                 | >2.00     | -100 m crossing of warm water river habitat<br>-low impact   | -bridge; no channel alteration or piers in channel  | -no harmful alteration<br>-no compensation required if bridged; confirm at detailed design stage                 |
| 127+450         | BR2<br>Black River                                 | -permanent pond (old quarry), moderate littoral habitat<br>-good flow from pond outlet but channel connection to Black River too steep for upstream migration<br>-moderate fish habitat  | --                     | --        | -loss of quarry pond habitat (fill 60%) (spawning, feeding, refugia habitat for warm water species)<br>-loss of minor flow contribution to Black River<br>-moderate impact | -none available   | -loss of pond habitat and channel<br>-compensation requirement to be determined at detailed design stage         |
| 127+025         | BR3<br>Black River                                 | -shallow, algae filled swale<br>-no connection to Black River<br>-poor fish habitat  | 1.00-2.00              | 0.20      | -100 m alteration of watercourse that conveys field drainage (no fish present)<br>-low impact  | -culvert to maintain fish passage opportunities and conveyance function                     | -no harmful alteration<br>-no compensation required  |
| 126+900         | BR4<br>Black River                                 | -seasonal connection to Black River, slight flow<br>-grass lined swale, abundant algae<br>-poor fish habitat   | 1.60                   | 0.17      | -100 m alteration of ephemeral fish habitat (migratory route, feeding, potential spawning for warm water forage species - e.g. white sucker)<br>-low impact                | -culvert to maintain fish migration and low flow channel                                    | -loss of feeding and potential spawning habitat<br>-compensation not required; confirm at detailed design stage  |
| 126+050         | SS1<br>Sod Swamp                                   | -no authorization by property owner to access land<br>-downstream of crossing location:<br>-slight flow of agricultural drainage to Sod Swamp<br>-grass lined, poorly defined channel (south of Homestead Road)<br>-poorly defined channel through tilled cropland (north of road)<br>-poor fish habitat | <1.00                  | 0.10      | -based on information gathered downstream, assuming habitat is similar - 100 m alteration of minnow habitat (feeding, refugia, potential spawning)<br>-low impact          | -culvert to maintain fish migration, refugia and low flow channel                           | -loss of feeding and potential spawning habitat<br>-compensation not required; confirm at detailed design stage  |
| 123+450         | RD8<br>Road Drainage                               | -dry, grassy road ditch<br>-no fish habitat  | --                     | --        | -no fish habitat loss<br>-no impact  | -none required  | -no harmful alteration<br>-no compensation required  |
| 123+325         | MR1<br>Maskinonge River<br>(natural areas sin. 24) | -no drainage channels observed in field<br>-no fish habitat  | --                     | --        | -no fish habitat loss<br>-no impact  | -none required  | -no harmful alteration<br>-no compensation required  |
| 123+225         | MR2<br>Maskinonge River<br>(natural areas sin. 24) | -no drainage channels observed in field<br>-no fish habitat  | --                     | --        | -no fish habitat loss<br>-no impact  | -none required  | -no harmful alteration<br>-no compensation required  |
| 123+100         | MR3<br>Maskinonge River<br>(natural areas sin. 24) | -no drainage channels observed in field<br>-no fish habitat  | --                     | --        | -no fish habitat loss<br>-no impact  | -none required  | -no harmful alteration<br>-no compensation required  |
| 119+300         | MR4<br>Maskinonge River<br>(natural areas sin. 22) | -3rd order, permanent flow to Lake Simcoe (main branch)<br>-well defined channel, silt/muck/gravel bottom<br>-good fish habitat  | 4.00-6.00              | 0.20-0.80 | -100 m crossing of fish habitat (migratory, spawning, feeding refugia habitat for warm water species)<br>-low impact   | -bridge (span floodplain)   | -no harmful alteration<br>-no compensation required  |

1 Habitat loss is based on 100m width ROW; actual area of loss to be confirmed at detail design stage  
2 Length required to be confirmed at detail design stage  
3 Species use to be confirmed at detail design stage  
4 Confirm design at detail design stage

| Chainage | Unit # | Drainage System                              | Existing Conditions at Crossing  | Channel Dimensions<br>Width<br>Depth | Potential Impact/Habitat Loss  | Fisheries Mitigation  | Net Effect   |
|----------|--------|--|--|--------------------------------------|--|---|--|
| 118+650  | MR5    | Maskinonge River<br>(natural areas sin. 21)  | -3rd order, permanent flow to Lake Simcoe, main branch, grassy banks, run/pool habitat, silt/sand/muck/gravel bottom, good instream cover, slightly entrenched, limited pike spawning habitat<br><b>-good fish habitat</b> | 2.50-6.00                            | -may lose floodplain habitat that has limited potential as pike spawning habitat, if ROW or embankment shift profile<br><b>-low impact</b>                   | -maintain or reduce current alignment to keep works away from floodplain and river  | -no harmful alteration<br>-no compensation required  |
| 118+350  | MR6    | Maskinonge River<br>(natural areas sin. 20)  | -3rd order, permanent flow to Lake Simcoe, main branch, run/pool habitat, silt/sand/muck/gravel bottom, good instream cover, overhanging grasses, slightly entrenched<br><b>-good fish habitat</b>                         | 2.00-6.00                            | -100 m crossing of fish habitat (migratory route, refuge for warm water species, potential pike spawning)<br><b>-low impact</b>                              | -bridge (span floodplain), no piers in river, no channel alteration   | -no harmful alteration<br>-no compensation required if bridged   |
| 116+400  | MR7    | Maskinonge River<br>(natural areas sin. 18)  | -slow flow with connection to Maskinonge River, limited pike spawning habitat, straight channel excavated through cattail swamp<br><b>-moderate fish habitat</b>   | NA                                   | -alteration to bend in channel<br><b>-low impact</b>   |   |  |
| 116+225  | MR8    | Maskinonge River<br>(natural areas sin. 18)  | -slow flow with connection to Maskinonge River, limited pike spawning habitat, straight channel excavated through cattail swamp<br><b>-moderate fish habitat</b>   | NA                                   | -alteration to 20% of drainage channel<br><b>-low impact</b>   |   |  |
| 116+150  | MR9    | Maskinonge River<br>(natural areas sin. 18)  | -slow flow with connection to Maskinonge River, limited pike spawning habitat, straight channel excavated through cattail swamp<br><b>-moderate fish habitat</b>   | NA                                   | -alteration to 90% of drainage channel<br><b>-low impact</b>   | -mitigate for wetland function purposes<br>-curvet to maintain flow conveyance  | -no harmful alteration<br>-no compensation required; confirm at detail design stage  |
| 116+075  | MR10   | Maskinonge River<br>(natural areas sin. 18)  | -slow flow with connection to Maskinonge River, limited pike spawning habitat, straight channel excavated through cattail swamp<br><b>-moderate fish habitat</b>   | 3.00                                 | -alteration to 50% of drainage channel (no fish present)<br><b>-low impact</b>   |   |  |
| 115+800  | MR11   | Maskinonge River<br>(natural areas sin. 18)  | -permanent flow to Lake Simcoe, main branch<br>-well defined channel, low lying, grassy banks suitable for pike spawning<br><b>-good fish habitat</b>  | 4.20                                 | -60 m alteration of fish habitat (migratory route feeding/refugia, loss of high potential spawning habitat for pike)<br><b>-high impact</b>                  | -realign creek beyond ROW to maintain habitat function<br>-narrow embankment to reduce impact on creek<br>-curvet to maintain linkage | -potential loss of spawning area<br>-compensation required for loss of spawning habitat; confirm at detailed design stage<br>-no harmful alteration<br>-no compensation required |
| 114+750  | MR12   | Maskinonge River<br>(natural areas sin. 17)  | -moderate seasonal flow with connection to Maskinonge River<br>-conveys agricultural drainage through poorly defined channel (likely ephemeral)<br><b>-poor fish habitat</b>   | 3.00                                 | -130 m of seasonal stickleback spawning habitat<br><b>-low impact through interchange</b>  |   |  |
| 112+650  | RD9    | Road Drainage                                | -dry road ditch<br>-no connection with Maskinonge due to slope direction<br><b>-no fish habitat</b>  | --                                   | -no fish habitat loss<br><b>-no impact</b>   | -none required  | -no harmful alteration<br>-no compensation required  |
| 109+575  | MR13   | Maskinonge River<br>(natural areas sin. 12)  | -good flow with connection to Maskinonge River<br>-well defined channel, alternating soft and firm bottom<br><b>-good fish habitat</b>   | 1.10                                 | -100 m alteration of minnow spawning habitat (also potential spawning, migratory route for warm water species, i.e. pike)<br><b>-moderate to high impact</b> | -curvet to maintain spawning substrates, migration route and low flow channel   | -loss of overhanging grasses and undercut banks<br>-compensation likely required; confirm at detailed design stage   |
| 108+475  | MR14   | Maskinonge River<br>(natural areas sin. 10)  | -good flow with connection to Maskinonge River<br>-well defined channel, moderately firm bottom with some instream grasses<br><b>-moderate fish habitat</b>  | 0.70                                 | -350 m alteration of minnow habitat through interchange (feeding/refugia)<br><b>-moderate to high impact</b>   | -curvet to maintain spawning substrates, fish passage and low flow channel; opportunity to daylight creek through interchange         | -compensation likely required; confirm at detailed design stage  |
| 106+000  | MA1    | Mount Albert Creek<br>(natural areas sin. 8) | -good flow with connection to Black River<br>-moderately defined channel through cattail wetland<br><b>-moderate fish habitat</b>  | 0.80                                 | -120 m alteration of minnow habitat (feeding/refugia)<br><b>-moderate to high impact</b>   | -curvet to maintain spawning substrates, fish passage and low flow channel  | -compensation likely required; confirm at detailed design stage  |
| 104+800  | RD10   | Road Drainage                                | -dry road ditch with no connection to flowing system<br><b>-no fish habitat</b>  | --                                   | -no fish habitat loss<br><b>-no impact</b>   | -none required  | -no harmful alteration<br>-no compensation required  |
| 104+400  | RD11   | Road Drainage                                | -dry road ditch with no connection to flowing system<br><b>-no fish habitat</b>  | --                                   | -no fish habitat loss<br><b>-no impact</b>   | -none required  | -no harmful alteration<br>-no compensation required  |
| 100+750  | HR1    | Holland River<br>(natural areas sin. 2)      | -slight flow with weak connection to Holland River System<br>-poorly defined shallow channel conveys agricultural drainage<br>-very silty substrate<br><b>-poor fish habitat</b>   | 1.70                                 | -100 m alteration of agricultural field drainage channel (no fish present)<br><b>-low impact</b>   | -curvet to maintain fish passage opportunity and conveyance function  | -no harmful alteration<br>-no compensation required  |

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2 Length required to be confirmed at detail design stage

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4 Confirm design at detail design stage

# HIGHWAY 404 EXTENSION

Davis Drive to Highway 12

Route Planning Study and Environmental Assessment

## SUMMARY OF IMPACTS TO AQUATIC FEATURES



Some of the potential impacts to these channels include the loss of refuge habitats and change in flow contribution to downstream habitats. Functions of these habitats can be maintained with the culverts proposed and thus no harmful alteration of fish habitat occurs. Five (5) other crossings with low impact include encroachments or effects to wetland channels with standing water and limited fish habitat potential.

The remaining five (5) crossings given a low impact designation are large channels associated with the Black and Maskinonge Rivers and Pepperlaw Brook, that will be bridged. These channels are not expected to be altered by the presence of a bridge. The bridge span over the Pepperlaw Brook may require piers in the river bed which could elevate its impact to moderate. Some bank disturbance may occur through the construction phase but this can be mitigated with restoration post construction.

Three crossings will have a moderate impact from the highway. At these crossings, small artificial ponds exist. One pond (GH2) was dug to collect surface runoff from adjacent fields and now contributes the majority of flow to a road ditch. The second pond is also a dug farm pond (LS2) that likely contributes to the flow in a small ditch in high water during the spring. The third pond, an abandoned gravel pit pond (BH2), provides a minor flow contribution to the Black River. The ponds provide spawning, feeding, and refuge habitat for warm water species. These ponds will be filled in so that their flow contributions to the adjacent channels will be severed. Although the loss of these habitats may constitute a moderate impact based on our criteria, they are not assessed as harmful alterations as the ponds are artificial and are not sustainable over the long term without management.

Five of the crossings, four streams and one pond, will sustain moderate-high impacts from the construction of the highway. The habitat in the channels provides feeding and refuge habitat for minnow species and possibly seasonal spawning habitat. Since no previous alterations have taken place at these locations, they have been assessed at a higher level of impact than similar habitats where culverts are already present. The pond (MC2) is a small spring-fed pond in a private yard that provides minnow habitat and flow to a small tributary of Morning Glory Creek. The baseflow to the tributary can be maintained if the pond is filled in and groundwater flow movement is not impeded.

The highway will have a high impact on four crossings (MC4, LS5, LS9, MR11). These channels are considered to provide permanent feeding and refuge habitat, migratory routes and potential spawning habitat for top predator species such as northern pike (*Esox lucius*), smallmouth bass and/or yellow perch. The impacts include the loss of pike spawning habitat and alterations to other habitat functions such as feeding and refugia.

#### 5.4.2.2 Vegetation

Through the route selection process, most of the environmentally significant sites (mostly wetlands) in the study area were avoided. The preferred route was initially identified by evaluating and comparing several route alternatives. Although other issues had to be considered as well, the present route reflects an attempt to avoid the most extensive wetlands and forested areas. Route refinements have been made to shift the alignment where possible to relieve impacts to vegetation.

The remaining vegetation along the route is largely upland, and under agricultural use. Where areas of natural vegetation occur, they are, in a few cases, farm woodlots, but



more often areas of marsh and swamp where the high water table made farming not practical.

Exhibit 5.7 summarizes the effects to vegetation units along the proposed Highway 404 extension (For the location of each vegetation unit, refer to plates included in Appendix 3.). Approximately 125 ha of natural vegetation will be removed on approximately 24% of the land area of the entire ROW. Almost two-thirds of this area is wetland, while the remaining third is composed of upland woodlots (wetlands will be described separately in Section 5.4.2.3). The 41 natural features affected by the technically preferred route are summarized on Exhibit 5.7.

Where it was not possible to avoid a natural feature, the objective was to remove as little of the feature as possible, and preferably on the edge to maintain maximum connectivity of natural areas. Crossings that sever natural areas resulting in two fragments greater than a hectare in size (and often much larger) were considered to be more significant impacts, and effort was made to minimize these wherever possible.

The upland woodlots consist of mixed or deciduous species composition of varying ages. Along the southwestern half of the route, the landscape is quite intensively cultivated and the highway mainly cuts through portions of small isolated woodlots. The crossings are generally small (less than 200 m) and numerous, with the largest being near Queensville (unit 9) and between Boag and Holborn Roads (unit 14). Most of the woodlot crossings occur south of Keswick.

Along the alignment, only one woodlot is removed in its entirety, just north of Newmarket. There was no opportunity to avoid it as the terminus of the existing Highway 404 abuts it. However, due to the small size of the woodlot and the lack of significant attributes associated with it, its removal is considered to be a low impact.

Nine natural areas were fragmented, the most significant of these occurs at the Sod Swamp (Unit 25) in the northwest of the study area, at the Vachell Swamp south of Sutton (Unit 33), and at the Maskinonge Wetland (Unit 18). The crossing at Sod Swamp would be considered a moderately high impact as it is fragmenting the unit between two complementary vegetation communities. However, there are few significant attributes associated with this wetland and it is only weakly connected to the wildlife corridor network in the area. Therefore this would be considered a moderate impact. The crossings at Vachell and Maskinonge are considered moderate impacts, and the others would be considered low.

Removal of edges on 23 units results in low impacts, but will require an edge management strategy to mitigate for the effects. A further 5 units are encroached upon by the highway, but the impact will be confined to minor noise and pollution effects as we do not expect direct physical disturbance to result.

Three areas associated with the Maskinonge River crossings (Units 20, 21, 22) have losses of riparian vegetation which are expected to be of low impact.

Wetlands consist largely of mixed or deciduous swamp forest, and thicket swamp. A relatively small amount of marsh is also present. Wetlands are discussed in more detail in Section 5.4.2.3.



| Unit # | Chainage           | Feature  | Potential Impact   | Mitigation  | Net Impact   | Comments   |
|--------|--------------------|--|--|---|--|--|
| 1      | 100+100 to 100+425 | small isolated woodland, mixed age maple/beech   | removes entire 4.4 ha of forest, minor wildlife habitat  | none  | 4.4 ha woodland removed, minor loss of wildlife habitat<br>low impact  | woodlot located at terminus of existing route, unavoidable   |
| 2      | 100+700 to 100+850 | edge removal of isolated apple/hawthorn/cedar woodland and intermittent drainage (aquatic station HRI1)      | removes 2 ha edge woodland, minor wildlife habitat   | none, possible culvert to avoid ponding adjacent to highway   | 2 ha edge of woodland removed<br>low impact  |  |
| 3      | 102+300 to 102+550 | edge removal of isolated Sugar Maple woodland & drainage   | removes 3.3 ha edge, half of woodland, minor wildlife habitat                                    | none  | half (3.3 ha) of woodland removed, minor loss of wildlife habitat<br>low impact  |  |
| 4      | 102+900 to 103+100 | isolated woodland  | highway encroachment within 25m  | none  | no habitat loss, minimal wildlife disturbance<br>minimal impact  |  |
| 5      | 102+700            | isolated wetland   | highway encroachment within 40m from Hwy   | minimize construction activity on wetland side of corridor; direct drainage into median and/or ditches for pretreatment prior to outlet to wetlands   | no habitat loss, minimal wildlife disturbance<br>minimal impact  |  |
| 6      | 103+500 to 103+750 | 2 small woodlots connected by hedgerows  | removes 1.5 ha edge of narrow woodland strips  | none  | 1.5 ha woodland removed, isolates small woodland<br>low impact   |  |
| 7      | 104+375 to 104+760 | isolated mature Red Maple/Silver Maple woodland  | removes edge 4.4 ha woodland; creation of ponding  | minimize fill; employ sediment and erosion controls during construction; stabilize exposed slopes and revegetate quickly; direct road drainage to median and/or ditches for pretreatment prior to outlet to woodland  | woodlot removed 4.4 ha<br>low impact   | on till plain, high water table  |
| 8      | 105+700 to 106+25  | cedar/trembling aspen/balsam poplar woodland adjacent to willow/red osier dogwood wetland (aquatic sta. MA1) | removes 2 ha of woodland and 1.2 ha of wetland; bisects woodland creating a fragmentation effect | potential to allow 1 ha of isolated tableland to naturalize to woodland equalizing culverts required as well as culverts to permit passage of amphibians; employ sediment and erosion controls during construction; stabilize exposed slopes and revegetate | net loss of woodland 1 ha, 1.2 ha of wetland removed; some loss of connectivity for small mammals and amphibians<br>low impact | area of concern to the Ministry of Natural Resources; high water table, impact to wetland will be removed if highway shifts to east as result of Queensville plan, vegetation removed remains similar, but leaves a larger patch of habitat intact to the west |
| 8A     | 106+875 to 107+90  | small isolated woodland  | removes 4 ha edge  | edge planting   | edge of woodland removed<br>low impact   | this woodland may remain if the Queensville plan requires the alignment to move east   |
| 9      | 107+450 to 107+880 | isolated sugar maple, butternut and American beech woodland; regionally rare plant (Canada Waterleaf)        | removes 5.3 ha woodland on drumlin, wildlife habitat   | none  | 5.3 ha edge (60%) of woodland removed; minor wildlife habitat lost, loss of regionally rare plant<br>low impact                | this woodland may remain if the Queensville plan requires the alignment to move east; hedgerows  |
| 11     | 108+900 to 109+150 | beech/sugar maple woodland on side of drumlin; north of MR14   | removes 0.3 ha along edge of two woodlots; increases functional isolation                        | edge management required to seal woodland edge  | 0.3 ha edge of woodland removed<br>low impact  |  |
| 13     | 110+140 to 110+550 | isolated basswood/black maple/ash woodland; habitat for red-headed woodpecker                                | 1.8 ha edge of woodland removed  | edge management required to seal woodland edge  | 1.8 ha edge of woodland removed, loss of habitat for provincially rare species<br>low impact                                   |  |

note that aquatic issues are cross referenced to a sampling site on Exhibit 5.6  
feature codes (1 through 46) are located on maps to be included in the appendix



| Unit # | Chainage           | Feature   | Potential Impact  | Mitigation   | Net Impact   | Comments   |
|--------|--------------------|---|---|--|--|--|
| 14     | 111+380 to 112+210 | mature maple, bitternut hickory, beech woodlot with some hemlock  | 4.1 and 2.7 ha woodlot removed from edges of connected patches of woodlot; wildlife habitat; fragmentation of patch | edge management required to seal woodlot edge adjacent to creek corridor in north only; potential to allow 1 ha of isolated tableland to naturalize to woodlot   | 50% of woodlot (5.8 ha) removed; woodlot fragment isolated from river<br><b>low impact</b>     | veg and stream unit functionally related                                     |
| 14B    | 113+620 to 113+940 | small isolated woodlot  | 2.2 ha edge of woodlot removed  | none   | 2.2 ha edge (60%) of woodlot removed<br><b>low impact</b>                                      |  |
| 17     | 114+600 to 115+40  | isolated red ash/red maple swamp woodlot (aquatic sta. MR12)  | 4.7 ha edge of woodlot removed; severs link between creek and upland; high water table;                             | minimize fill; employ sediment and erosion controls during construction, stabilize exposed slopes and revegetate quickly; direct road drainage to median and/or ditches for pretreatment prior to outlet to woodlot                                    | edge (40%) of woodlot removed (4.7 ha)<br><b>low impact</b>                                    | high water table   |
| 18     | 115+625 to 116+600 | Maskinonge Wetland, willow/red osier dogwood swamp and cattail marsh (aquatic stations MR7 to MR11)     | 9.3 ha swamp and marsh removed; moderate wildlife habitat; fragmentation  | equalizing culverts as well as culverts for amphibian passage; minimize fill; employ sediment and erosion controls during construction; stabilize exposed slopes and revegetate quickly; direct road drainage to median and/or ditches                 | 9.3 ha edge of wetland removed<br><b>moderate impact</b>                                       | area of concern to the Ministry of Natural Resources; water table at surface |
| 19     | 117+825 to 118+50  | cedar woodlot   | 2.2 ha edge of woodlot removed  | edge management required to seal woodlot edge adjacent to creek corridor in north only; potential to allow 2 ha of isolated tableland to naturalize to woodlot   | edge of woodlot lost offset by naturalization creating net loss of 0.2 ha<br><b>low impact</b> |  |
| 20     | 118+270 to 118+340 | Maskinonge River crossing, cedar on slopes (aquatic sta. MR6)   | veg. loss of riparian 0.8 ha; crosses local wildlife corridor; fragmentation  | minimize fill; employ sediment and erosion controls during construction; stabilize exposed slopes and revegetate quickly; direct road drainage to median and/or ditches for pretreatment prior to outlet to river; wildlife corridor link under bridge | 0.8 ha fragment of woodlot lost<br><b>low impact</b>   |  |
| 21     | 118+580 to 119+40  | wooded slope (black ash and red maple with some cedar and hemlock) below top of bank (aquatic sta. MR5) | 0.8 ha edge riparian woods removed  | minimize fill; employ sediment and erosion controls during construction; stabilize exposed slopes and revegetate quickly; direct road drainage to median and/or ditches for pretreatment prior to outlet to river                                      | 0.8 ha edge of woodlot<br><b>low impact</b>  |  |
| 22     | 119+200 to 119+500 | ash/poplar wooded slopes with ostrich fern understory at river crossing (aquatic sta. MR4)              | 3 ha of riparian and adjacent upland forest removed; crosses local wildlife corridor; fragmentation                 | minimize fill; employ sediment and erosion controls during construction; stabilize exposed slopes and revegetate quickly; direct road drainage to median and/or ditches for pretreatment prior to outlet to river; wildlife corridor link under bridge | 3.0 ha fragment of woodlot removed<br><b>low impact</b>  |  |
| 22C    | 120+100            | isolated woodlot  | highway encroachment within 25m   | none   | minimal wildlife disturbance<br><b>minimal impact</b>  |  |
| 23     | 122+0 to 122+450   | isolated upland woodlot   | 2.6 ha edge of woodlot plus 120m hedgerow removed   | edge management required to seal woodlot edge  | 2.6 ha edge (40%) of woodlot removed<br><b>low impact</b>                                      |  |

note that aquatic issues are cross referenced to a sampling site on Exhibit 5.6  
feature codes (1 through 46) are located on maps to be included in the appendix

|   |  |  |   |                     |
|---|--|--|---|---------------------|
| <br><b>Ontario</b><br>Ministry of Transportation | <b>HIGHWAY 404 EXTENSION</b><br>Davis Drive to Highway 12<br>Route Planning Study and Environmental Assessment |  | <b>SUMMARY OF IMPACTS TO TERRESTRIAL FEATURES</b> | <b>EXHIBIT 5.7B</b> |
|   |                           |  |   |                     |



| Unit # | Chainage           | Feature   | Potential Impact  | Mitigation   | Net Impact   | Comments  |
|--------|--------------------|---|---|--|--|---|
| 25     | 123+975 to 125+275 | Sod Swamp and forest complex: birch/aspen/balsam poplar/cedar woodland upslope of cedar/willow swamp  | 6.2 ha wetland removed and 5.8 ha upland forest removed along wetland boundary; fragmentation of complex habitat; wildlife habitat      | minimize fill; employ sediment and erosion controls during construction; stabilize exposed slopes and revegetate quickly; direct road drainage to median and/or ditches for pretreatment prior to outlet to river; seal edge of wetland                | 12 ha of woodland and swamp removed; local fragmentation of habitat and interruption of link to upland<br><b>moderate impact</b> |   |
| 26     | 125+300 to 125+500 | ash/poplar forest knob at north end of cedar swamp  | removal of 0.4 ha edge of wetland and 0.4 ha woodland   | edge management required to seal woodland edge   | 0.8 ha edge of woodland removed<br><b>low impact</b>   |   |
| 27     | 126+420 to 126+800 | isolated woodland   | 3 ha woodland removed fragmenting woodland patch  | none   | woodlot fragmented; habitat removed 3 ha; minor loss of wildlife habitat<br><b>low impact</b>                                    |   |
| 28     | 127+800 to 128+150 | isolated woodland   | 3 ha woodland removed from edge   | edge management required to seal woodland edge   | 3 ha edge of woodland removed<br><b>low impact</b>   |   |
| 29     | 129+100            | Black River crossing, strip of forest of ash and balsam poplar on slopes (aquatic sta. BR1)   | removes narrow border of riparian wetland and trees; crosses local wildlife corridor; encroachment on woodland on west side of river    | wildlife corridor link accommodated under proposed bridge<br>no additional mitigation required   | minor removal of riparian vegetation; minor removal of wildlife habitat<br><b>low impact</b>                                     | Ministry of Natural Resources area of concern   |
| 30     | 129+125 to 129+650 | woodlot varying from dense cedar to elm/ash to hemlock/cedar at river   | 1 ha edge of forest and 1.2 ha successional habitat removed; crosses local wildlife corridor  | edge management required to seal woodland edge; wildlife crossing maintained under bridge to the west  | 2.2 ha woodland removed<br><b>low impact</b>   | high water table  |
| 32     | 131+275 to 132+900 | upland ash/poplar woodland at north edge of Vachell Swamp   | 15.6 ha forest removed; disruption of wildlife corridor; moderate wildlife habitat; highway embankment may cause damming; fragmentation | equalizing culverts may be required, 2m wide culverts for wildlife movement every 100m through swamp, chain link fencing along forest/hwy. edge; edge management required to seal woodland edge; erosion and drainage controls required; minimize fill | 15.6 ha forest removed, fragmentation of habitat<br><b>moderate impact</b>   | high water table, depth of organic soils unknown; Ministry of Natural Resources area of concern |
| 33     | 133+150 to 134+700 | wet cedar/aspen/birch/ash woods and thicket swamp, east of Vachell Swamp, small drainage channels (aquatic sta. LS10 to LS14); two regionally rare species: Sweet Coltsfoot ( <i>Petasites palmatus</i> ) and White Adder's Mouth ( <i>Malaxis monophylla</i> ) | 8.6 ha edge of wetland removed; loss of rare species  | potential to allow 5.4 ha of open space to naturalize between units 32 and 33, open bottom culvert at LS14; confirm presence of rare species and evaluate impacts and ability to transplant if required  | 8.6 ha edge of wetland removed; with naturalization, 3.2 ha habitat removed<br><b>moderate impact</b>                            | Ministry of Natural Resources area of concern   |
| 34     | 134+700 to 135+750 | woodlot connected to Vachell Swamp  | 8.5 ha of wet and upland forest removed; fragmentation of habitat; minor wildlife habitat   | edge management required to seal woodland edge; improve connectivity of habitat through open bottom culvert  | 8.5 ha woodland removed; fragmentation; minor wildlife habitat removed<br><b>low impact</b>                                      | high water table  |
| 35     | 137+280            | isolated woodland along drainage swale (aquatic sta. LS9)   | 1.1 ha forest removed; minor fragmentation of hedgerow along drainage feature although crossing is at narrowest point                   | culvert for local drainage to avoid ponding and improve connectivity of habitat  | 1.1 ha woodland removed<br><b>low impact</b>   | high water table, drainage to be confirmed at site design                                       |
| 36     | 137+750 to 138+0   | isolated small woodland   | highway encroachment within 25m; minor wildlife effects   | none   | minimal wildlife disturbance<br>minimal impact   |   |

note that aquatic issues are cross referenced to a sampling site on Exhibit 5.6 feature codes (1 through 46) are located on maps to be included in the appendix

| Unit # | Chainage           | Feature   | Potential Impact  | Mitigation   | Net Impact  | Comments  |
|--------|--------------------|---|---|--|---|---|
| 37     | 138+500            | isolated small woodlots   | highway encroachment on two woodlots within 30m; minor wildlife habitat                               | none   | minimal wildlife disturbance<br>minimal impact  |   |
| 38     | 139+175 to 139+600 | Morning Glory Swamp, cedar/ aspen woods (aquatic sta. MC1 to MC4)   | 2.9 ha edge of forest removed; crosses local wildlife corridor; fragmentation of wildlife habitat+D40 | install 2x4m culvert over creek, 2m wide culverts every 100m through forest, chain link fencing at forest edge.                                  | 2.9 ha wet forest removed; minor wildlife disturbance<br>low impact                           | high water table; Ministry of Natural Resources area of concern |
| 39     | 139+600 to 139+775 | edge of wet cedar/ maple/ beech/ hemlock woodlot, with open field included  | 1.1 ha forest and field removed   | edge management required to seal woodlot edge; improve connectivity of habitat through culvert   | 1.1 ha vegetation removed<br>low impact   | high water table  |
| 41     | 141+400            | Pefferlaw Brook crossing in urban area (aquatic sta. PB3)   | crosses local wildlife corridor linked to a regional corridor   | bridge provides wildlife passage; erosion and sediment controls during construction; restore stable slopes and revegetate quickly; minimize fill | none<br>no impact   |   |
| 41D    | 143+580 to 144+0   | isolated woodlot  | 4 ha of edge of woodlot removed (interchange); fragmentation of habitat; wildlife habitat             | none   | 4 ha (60%) of woodland removed; wildlife habitat removed<br>low impact                        | high water table  |
| 43     | 144+500 to 147+900 | Port Bolster Swamp (aquatic sta. PS1 to PS5); immature ash/ elm/ aspen and cedar thickets before highway twins with highway 48 in existing right-of-way | 4.3 ha edge of wetland removed; minor wildlife habitat removed; increased fragmentation of habitat    | culverts may be required to avoid ponding  | 4.3 edge of wetland removed<br>low impact   | water table at surface  |
| 44     | 148+340 to 149+550 | Gibson Hill Swamp (aquatic sta. GH3 to GH7); young aspen/ elm/ ash wet woodlot  | twinning within existing right-of-way, therefore impact limited to increased fragmentation of wetland | oversized culverts that permit small mammal and amphibian movement no additional mitigation required   | minor wildlife disturbance<br>minimal impact  |   |
| 45     | 150+100 to 150+400 | young ash/ elm wet woodlot  | highway encroachment within 25m, minor wildlife disturbance   | none   | minimal wildlife disturbance<br>minimal impact  |   |
| 46     | 152+640 to 153+0   | isolated woodlot  | 4.5 ha removed; wildlife habitat  | none   | 4.5 ha (40%) of woodlot removed; severe fragmentation, wildlife habitat removed<br>low impact |   |

note that aquatic issues are cross referenced to a sampling site on Exhibit 5.6  
feature codes (1 through 46) are located on maps to be included in the appendix



The flora consists of plant species typical of swamps, upland forests and old fields in the Great Lakes - St. Lawrence Lowland Forest Region in Ontario. No unique vegetation types or provincially rare species were encountered. However, three species considered regionally rare in the Regional Municipality of York by Riley (1989) were located:

|  |         |
|--|---------|
| Canada Waterleaf ( <i>Hydrophyllum canadense</i> ) | unit 9  |
| Sweet Coltsfoot ( <i>Petasites palmatus</i> )      | unit 33 |
| White Adder's Mouth ( <i>Malaxis monophylla</i> )  | unit 33 |

The Canada Waterleaf is typically a more southern species that forms patches in upland deciduous forest. A single patch was located. The Sweet Coltsfoot is typically a more northern species which was found growing as scattered individuals in the eastern portion of Vachell Swamp. A single example of the tiny White Adder's Mouth was also documented in mixed wet forest in Vachell Swamp. These species were observed to the south of the present alignment but were not confirmed on the Technically preferred route. It is possible that the preferred alignment results in the removal of all, or a portion of these species, where they occur, but at the time of design their presence should be confirmed.

#### 5.4.2.3 Wetlands

Of the 34 evaluated wetlands in the study area, the proposed Highway 404 extension crosses six (Exhibit 5.7). Of these, the highway twins existing Highway 48 in the existing right-of-way at two wetlands (Port Bolster Swamp and Gibson Hill Swamp), creating an increased impact to wildlife movement and minimal disturbance, but with minor further loss of habitat. All wetland crossings were identified as areas of concern by the MNR whose primary interest lay in minimizing the impact to the wetlands.

These wetlands are:

- Maskinonge Wetland (unit 18)
- Sod Swamp (unit 25)
- Vachell Swamp (units 32 and 33)
- Morning Glory Swamp (unit 38)
- Port Bolster Swamp (unit 43) (existing Highway 48 crossing)
- Gibson Hill Swamp (unit 44) (existing Highway 48 crossing)

The wetlands consist largely of mixed or deciduous swamp forest, and thicket swamp, and are not confined to the evaluated wetlands. A relatively small amount of marsh is also present. Approximately 78 ha of wetland vegetation will be removed with construction of the highway at nine crossings. The wetland crossings are fewer in number than woodlot crossings and are generally large (five crossings account for more than half of the impact). Crossing impacts are concentrated in the Maskinonge Swamp area south of Keswick, and the Vachell Swamp area southeast of Sutton. Our assessment has considered impacts to a larger area of wetland than that evaluated by the Ministry of Natural Resources as the Vachell Swamp, as we determined that a large block of forest to the east is also largely swamp, with a high water table throughout, that was overlooked at the time of the MNR wetland evaluation. The initial highway alignment was proposed further to the south of its present location in an area that removed more vegetation, but was relocated to the north to address concerns expressed by the public and agencies to reduce the impact to this extensive wetland/upland complex.

The significance of the impacts to wetlands as vegetation communities is similar to that detailed in Section 5.4.2.2. However, wetland function also had to be considered.



Crossings of bogs and fens would have been considered a high impact, however these were all avoided in the study area. Areas of high standing water represented a greater impact due to the need for extraordinary construction techniques and the likelihood that contaminants would travel farther and more quickly than in areas of wetland that are at least seasonally dry. These areas are most commonly associated with marshes, although may also be found in swamps. Swamps are the most common type of wetland in the study area, usually thicket swamps, or swamps dominated by Balsam Poplar and Trembling Aspen. Typically these wetland types are seasonally dry having fewer pathways for contaminant exchange and potentially pose less problems for construction. On this basis, crossings of marshes would have been considered to be a moderate impact, while crossings of swamp thicket is generally lower, however a long crossing in this wetland type would have elevated the concern to moderate.

Impact levels were also based on how the crossing affected the wetland - fragmentation being considered to have a moderate impact over removal of edges which were designated as a low impact. The size of the area impacted also factored into the evaluation with smaller areas relative to other larger areas along the alignment having a lower level of concern. Exhibit 5.7 includes the impact and mitigation of wetlands as a component of the terrestrial features.

Of the nine wetland crossings, one, (Unit 5) was considered to have no loss of area being encroached upon for a minimal expected impact. Five (5) have a low impact primarily related to the loss of edge where the highway is twinned at Gibson Hill (Unit 44) and Port Bolster (Unit 43) Swamps, and at three other areas (Units 8, 26, 38). Three crossings have moderate impacts at the crossing of the Maskinonge Wetland (Unit 18) which is largely marsh, at Sod Swamp (Unit 25) where fragmentation occurs and at Vachell Swamp (Unit 23) where a large piece of edge is affected.

#### 5.4.2.4 Wildlife

The study area contains a mix of upland and lowland habitats as well as a range of different successional types which is suitable for a high diversity of breeding birds, mammals and amphibians. Some forested areas are quite extensive and undisturbed, and function as good quality core habitat. The MNR has identified the following areas as important wildlife core areas:

- Maskinonge Wetland
- Black River
- Vachell Swamp
- Pepperlaw Brook
- Morning Glory Creek and Swamp

These areas also represent large creek valleys or extensive wooded areas which facilitate the movement and dispersal of wildlife species allowing a mixing of gene pools and an opportunity for recolonization.

South of Lake Simcoe, the route crosses six locally significant wildlife corridors, three of which connect to regional systems:

- Maskinonge River Corridor
- Black River to Sod Swamp Corridor
- Black River Corridor (regional)
- Mossington Park - Vachell Corridor
- Morning Glory Swamp Corridor (regional)
- Pepperlaw Brook Corridor (regional).

At the Maskinonge, Black River and Pepperlaw Brook, the proposed bridge spans provide opportunity for terrestrial passage for mammals, birds and other wildlife. The impact of these crossings on wildlife passage can be mitigated under the proposed bridges at those locations without further measures. The corridor crossing at Morning Glory Swamp and Vachell Swamp will require site specific design but will likely still impose moderate impacts to wildlife movement.

A number of small woodlots would be cut by the highway, especially in the southwest section. These woodlots have some functional value as wildlife habitat but they are poorly linked. They are therefore limited in the diversity and types of wildlife that they can harbour, and were considered less important as functional habitat than larger, connected natural habitats.

Through the breeding bird surveys conducted in 1995 and 1996, several significant species were detected along the preferred alignment. They include the following species:

|                          |                   |               |
|--------------------------|-------------------|---------------|
| Cooper's Hawk            | provincially rare | unit 30       |
| Red-headed Woodpecker    | provincially rare | unit 13       |
| Yellow-bellied Sapsucker | regionally rare   | units 32 & 38 |
| Yellow-rumped Warbler    | regionally rare   | unit 33       |

The presence of a rare breeding species is an indication of habitat quality but may not mean that a long term breeding territory exists. For example, the Red-headed Woodpecker populations across Ontario have declined steadily over the past two decades and, with present trends, is likely to disappear from the study area in the near future, irrespective of the highway.

The level of impact to wildlife was assessed based on:

- area of wildlife habitat removed;
- presence of rare species, or one with habitat requirements that are restricted within the study area (e.g., area-sensitive, age of associated vegetation);
- area of the natural habitat remaining with respect to the potential for area-sensitive species to occur;
- crossing of complexed habitats (e.g., highway crosses wetland/upland interface), and;
- degree of barrier to wildlife movement along corridors and links.

In general, high quality habitat has been avoided, and therefore wildlife impacts tend to be low to moderate. The impact to wildlife was considered as one of the factors in assessing impacts to terrestrial features that are summarized in Exhibit 5.7. The most common impacts to animals throughout the corridor will be to deer and to small mammals and/or reptiles and amphibians. Regional wildlife corridors typically occur in association with large river crossings and therefore continued linkage should be accommodated under the bridges. Only two crossings are expected to present a potential impact to the corridors warrant special mitigation measures. These are the Vachell Swamp (Unit 32) and the Morning Glory Swamp (Unit 38) where barrier fencing and special culvert considerations will be required. In addition, three other crossing locations associated with wetlands (Units 8, 18, and 44) are expected to have impacts to amphibians and/or small mammals which will require special mitigation measures in the form of dry culverts placed at frequent intervals across the wetland. Small mammals (up to the size of coyotes and fishers) and amphibians have smaller home ranges than the larger mammals and may be more sensitive to loss of connectivity. For



some species (especially the predators at the top of the food chain), it is reasonable to investigate options to ensure connectivity of habitat due to the potential to fragment populations.

Opportunities to provide terrestrial passage concurrent with stream crossings exist, and at the design phase, these crossings should be optimized to provide passage for these vertebrates. Most are facilitated due to the bridge span required at major creeks, however, the topography and existing culverts at Morning Glory Swamp are inadequate. At site design, an oversized culvert is appropriate that allows for the creek meander as well as terrestrial passage.

#### 5.4.2.5 Groundwater

The main groundwater issues associated with the proposed highway construction are:

- a) Maintenance of the groundwater flow regime (quality and quantity) especially in relation to streams.
- b) Maintenance of groundwater quantity. This involves the potential change in groundwater such as the lowering of the groundwater table from grading changes as a result of highway construction, or alteration of the infiltration capacity of the soils as a result of compaction or a change in soil types through imported fill.
- c) Maintenance of groundwater quality. This involves both construction and post construction activities. The refueling of vehicles during construction and the potential for spills is a concern with for groundwater quality. Road maintenance activities such as road salting in the winter as well as the potential for chemical spills on the roadway are post construction issues affecting groundwater quality.

The construction and maintenance of the highway will be undertaken in such a manner that the potential for adverse affects will be minimized. Specific areas of groundwater concern are outlined on Exhibit 5.8 (Chainage references correspond to plates included in Appendix 3.).

A summary of groundwater impacts and mitigation is provided in Exhibit 5.8. The highway alignment is broken into segments based on the surficial geology and sensitivity to contamination. The chainages noted in Exhibit 5.8 were obtained by superimposing the surficial geology on the highway right-of-way and measuring the area covered by the geological units. Areas of highly permeable soil are considered to be sensitive to groundwater contamination due to the potentially rapid movement of contaminants through these soils. Included in this group of soils are sands and gravels of glaciolacustrine and glaciofluvial origin as well as ice contact stratified drift. Also included in this category are organic deposits such as peat and alluvial stream deposits which contain a mixture of sand, gravel as well as silt and clay. Fine grained silt and clay soils have low permeability and do not allow rapid movement of contaminants through them. These are considered to have low sensitivity to contamination or alteration and include glacial tills as well as glaciolacustrine deposits. Actual soils along the preferred route have not been sampled to confirm the hydrogeological sensitivity but should be done at the design phase.

Approximately 28.6 km of the technically preferred route overlies soils that have been designated as highly permeable. Fine grained soils cover approximately 25.4 km of the route.



| Unit # | Chainage           | Hydrogeological Sensitivity | Wells / Residences within R.O.W   | Wells / Residences within 300m of R.O.W.     | Impacts   | Mitigation  | Comments                                   |
|--------|--------------------|-----------------------------|-----------------------------------|--|---|---|--|
| 1      | 100+000 to 101+800 | LOW                         | 0                                 | 16   | Low risk to ground water quality and quantity       | Confirm absence of wells at detailed design stage   | Newmarket/municipal supply                 |
| 2      | 101+800 to 102+300 | HIGH                        | 3 (within the interchange area)   | 6  | Potential risk to ground water quality and quantity | Wells in ROW to be properly plugged and abandoned; confirm at detailed design stage +G15Stormwater management plan<br>Till compacted soils<br>Backfill excavation with porous/native material<br>Well monitoring program; confirm need at detail+G19ed design stage |  |
| 3      | 102+300 to 102+680 | LOW                         | 0                                 | 0  | Low risk to ground water quality and quantity       | Confirm absence of wells at detailed design stage   | No wells within 300m of Right-of-Way       |
| 4      | 102+680 to 103+600 | LOW                         | 0                                 | 1  | Low risk to ground water quality and quantity       | Confirm absence of wells at detailed design stage   |  |
| 5      | 103+600 to 104+300 | LOW                         | 0                                 | 2  | Low risk to ground water quality and quantity       | Confirm absence of wells at detailed design stage   |  |
| 6      | 104+300 to 105+400 | LOW                         | 1                                 | 9  | Low risk to ground water quality and quantity       | Wells in ROW to be properly plugged and abandoned; confirm numbers and locations at detailed design stage<br>Stormwater management plan   |  |
| 7      | 105+400 to 106+200 | LOW                         | 0                                 | 1  | Low risk to ground water quality and quantity       | Confirm absence of wells at detailed design stage   |  |
| 8      | 106+200 to 108+100 | LOW                         | 0                                 | 3  | Low risk to ground water quality and quantity       | Confirm absence of wells at detailed design stage   |  |
| 9      | 108+100 to 113+900 | LOW                         | 4 (3 within the interchange area) | 14   | Low risk to ground water quality and quantity       | Wells in ROW to be properly plugged and abandoned; confirm numbers and locations at detailed design stage<br>Stormwater management plan   |  |
| 10     | 113+900 to 116+700 | HIGH                        | 1 (within the interchange area)   | 7  | Potential risk to ground water quality and quantity | Mitigation measures as listed for Unit 2  |  |
| 11     | 116+700 to 118+100 | LOW                         | 3                                 | 3  | Low risk to ground water quality and quantity       | Wells in ROW to be properly plugged and abandoned; confirm numbers and locations at detailed design stage<br>Stormwater management plan   |  |
| 12     | 118+100 to 121+800 | HIGH                        | 3                                 | 6  | Potential risk to ground water quality and quantity | Mitigation measures as listed for Unit 2  |  |
| 13     | 121+800 to 122+500 | LOW                         | 0                                 | 0  | Low risk to ground water quality and quantity       | Confirm absence of wells at detailed design stage   | No wells within 300m of Right-of-Way       |
| 14     | 122+500 to 124+000 | HIGH                        | 0                                 | 2  | Potential risk to ground water quality and quantity | Confirm absence of wells at detailed design stage<br>Stormwater management plan<br>Till compacted soils<br>Backfill excavation with porous/native material  |  |
| 15     | 124+000 to 126+300 | HIGH                        | 0                                 | 2  | Potential risk to ground water quality and quantity | Confirm absence of wells at detailed design stage<br>Mitigation measures as listed for Unit 14  |  |
| 16     | 126+300 to 130+000 | HIGH                        | 6 (within the interchange area)   | 15 residences, approx 80 trailers (@127+250) | Potential risk to ground water quality and quantity | Mitigation measures as listed for Unit 2  | Possible communal well(s) for trailer park |
| 17     | 130+000 to 132+000 | LOW                         | 0                                 | 3  | Low risk to ground water quality and quantity       | Confirm absence of wells at detailed design stage   |  |

NOTE: Wells /Residences from recent topographic plan of preferred route (1996).



Ministry of Transportation



# HIGHWAY 404 EXTENSION Davis Drive to Highway 12

Route Planning Study and Environmental Assessment

## SUMMARY OF IMPACTS TO GROUNDWATER

EXHIBIT

5.8A

| Unit # | Chainage           | Hydrogeological Sensitivity | Wells / Residences within R.O.W | Wells / Residences within 300m of R.O.W. | Impacts   | Mitigation  | Comments                                   |
|--------|--------------------|-----------------------------|---------------------------------|--|---|---|--|
| 18     | 132+000 to 133+100 | HIGH                        | 1                               | 3  | Potential risk to ground water quality and quantity | Mitigation measures as listed for Unit 2  |  |
| 19     | 133+100 to 135+900 | HIGH                        | 0                               | 1  | Potential risk to ground water quality and quantity | Confirm absence of wells at detailed design stage   |  |
| 20     | 135+900 to 138+300 | LOW                         | 0                               | 4  | Low risk to ground water quality and quantity       | Mitigation measures as listed for Unit 14   |  |
| 21     | 138+300 to 143+000 | HIGH                        | 8                               | 50 residences approx 230 trailers        | Potential risk to ground water quality and quantity | Confirm absence of wells at detailed design stage   |  |
| 22     | 143+000 to 143+800 | LOW                         | 2                               | 7  | Low risk to ground water quality and quantity       | Mitigation measures as listed for Unit 2  | Communal well(s) for trailer park          |
| 23     | 143+800 to 145+600 | HIGH                        | 1                               | 9  | Potential risk to ground water quality and quantity | Wells in ROW to be properly plugged and abandoned; confirm numbers and locations at detailed design stage |  |
| 24     | 145+600 to 146+000 | LOW                         | 0                               | 1 residence approx. 37 trailers          | Low risk to ground water quality and quantity       | Stormwater management plan  |  |
| 25     | 146+000 to 147+600 | HIGH                        | 0                               | 0  | Potential risk to ground water quality and quantity | Mitigation measures as listed for Unit 2  | Possible communal well(s) for trailer park |
| 26     | 147+600 to 148+200 | LOW                         | 1                               | 0  | Low risk to ground water quality and quantity       | Confirm absence of wells at detailed design stage   | No wells within 300m of Right-of-Way       |
| 27     | 148+200 to 149+100 | HIGH                        | 0                               | 0  | Potential risk to ground water quality and quantity | Wells in ROW to be properly plugged and abandoned; confirm numbers and locations at detailed design stage | No wells within 300m of Right-of-Way       |
| 28     | 149+100 to 149+700 | HIGH                        | 0                               | 3  | Potential risk to ground water quality and quantity | Stormwater management plan  | No wells within 300m of Right-of-Way       |
| 29     | 149+700 to 150+500 | HIGH                        | 0                               | 0  | Potential risk to ground water quality and quantity | Confirm absence of wells at detailed design stage   | No wells within 300m of Right-of-Way       |
| 30     | 150+500 to 154+000 | LOW                         | 2                               | 5  | Low risk to ground water quality and quantity       | Mitigation measures as listed for Unit 14   | No wells within 300m of Right-of-Way       |

NOTE: Wells / Residences from recent topographic plan of preferred route (1996)



Residences were identified from a detailed topographic plan of the technically preferred route. The number of residences in the right of way and within 300 m of it were counted. It was assumed that there was at least one well associated with each residence. Details of each well are not uniformly available for the study area and therefore the actual location and characteristics of the wells have not been determined. Three trailer parks occur within 300m of the highway right-of-way. It is likely that these trailer parks are served by a communal well or wells. The area around Newmarket, chainage 100+000 to 101+800 on Exhibit 5.8, is serviced by municipal water. The sensitivity of the soils and the presence of wells was used to determine the potential for impacts as well as the mitigation measures.

Two approved submissions are situated within 100 m of the proposed highway: Sharon Hills Phase IV and Pollock Estates (Keswick). Both developments are to be serviced by municipal water supplies. Pepperlaw Estates Subdivision (Pepperlaw is proposed to use private wells (this development is not yet approved).

Wells within the right-of-way are expected to be lost when residences are removed. Well abandonment will be carried out in compliance with O. Reg. 903.

Any septic systems falling within the right-of-way will be decommissioned in accordance with O. Reg. 358; the appropriate Regional Health Unit will be consulted regarding such decommissioning.

Thirty-nine (39) residences/wells were located within 300 metres of the right of way in soils of high hydrogeological sensitivity, as well as two trailer parks which may have a communal facility. Areas of high hydrogeological sensitivity present a high risk to groundwater quality and quantity as contaminants can move rapidly through the permeable soil. Further, the amount of ground water can be altered through diversion, pumping and changes in permeability from compaction or filling with non-native materials. These areas require mitigation measures to reduce the potential for groundwater impacts. Monitoring of general water quality and quantity in wells within 300m of the highway right-of-way will be undertaken in hydrogeologically sensitive areas prior to the onset of construction. Information collected will be used to assess changes in groundwater quality over time and will provide a basis for implementing remedial measures.

Areas of high hydrogeological sensitivity that have no wells within 300 metres of the highway right-of-way will initially not require any action until such time as the areas become occupied by residences or buildings requiring private wells. At that time, monitoring of water quality in wells may be required.

Fifty-two (52) wells/residences and one trailer park were located within 300 metres of the right of way in soils with low hydrogeological sensitivity. Areas of low hydrogeological sensitivity present a low risk to groundwater quality or quantity as contaminants, such as salt or from spills will move relatively slowly through the fine grained soil. Soils and wells in these areas are generally not at great risk of being affected by the highway and will require limited mitigation at the design phase.



### 5.4.3 Social Environment

#### 5.4.3.1 Community Effects

Through the avoidance of major urban areas during the corridor development stage, the preferred route avoided many of the intensely developed areas. The preferred route impacts 225 properties between Davis Drive and Highway 12, including 48 displaced residences. The displaced residences are primarily individual farmsteads, although there are residential clusters impacted, particularly in the vicinity of proposed interchange locations and grade separations.

Property impacts will be mitigated by providing fair market value for lands and buildings displaced by the proposed highway. For disrupted properties, compensation will be negotiated based on loss of use of the portion of property required for the new highway. Compensation will be negotiated with property owners generally two to three years in advance of construction. Where a property requires a total buy-out, and where the property owner approaches the MTO with a hardship/duress situation, the MTO may consider an advance purchase (i.e., prior to 2-3 years before construction).

The highest concentration of residential impacts is in the Pepperlaw area, where fourteen residences are displaced between Weir's Sideroad and Durham Road 23. Ten of these residences are located along the existing Highway 48 corridor. Much of these lands are designated for commercial uses in the Pepperlaw Community Plan, which is under review by the Town of Georgina.

Green Acres Trailer Park is a recreational land use near Pepperlaw that is directly impacted by the preferred route. As discussed previously, the preferred route was refined to reduce impacts to the park, however, the preferred route does disrupt the extreme north end of this facility. The disruption is limited to property displacement, with no direct impacts to buildings or services.

Pepperlaw Estates is a proposed residential subdivision located east of Riverbank Drive that is directly impacted by the proposed highway. As discussed previously, refinements to the preferred route were made to reduce impacts to the proposed subdivision. However, the preferred route displaces a portion of developable land at the north end of the subdivision and requires relocation of a proposed entrance to Highway 48. An easement has been incorporated in the property requirements for the proposed route to enable a connection to the future subdivision and Highway 48 via the underpass at Green Acres Trailer Park. The property required for the highway right-of-way will be acquired at fair market value.

During the route evaluation, it was noted that the preferred alternative generated the lowest impacts to the community of Pepperlaw, since impacts to the community were limited to the area in the vicinity of the existing highway corridor. The Town of Georgina Council noted that an interchange in the Pepperlaw area would "service the residents and businesses of Pepperlaw" and reduce potential economic impacts to the community.

Other recreational features impacted by the preferred route include recreational trails, particularly the trail along the abandoned railway right-of-way which the preferred route crosses near the Black River south of Sutton. During design, the proposed structure crossing the Black River will consider opportunities for accommodating the trail, to provide a trail crossing under the highway. Opportunities for providing crossings for other future trails at grade separations and structures over watercourses will also be considered in the design phase.

#### 5.4.3.2 Noise

##### Methodology

In accordance with the MTO Noise Protocol, an increase in future noise levels greater than 5 dBA with the new highway compared to future noise levels without the new highway was considered to be an environmentally significant issue. Noise impacts were a consideration during the evaluation of route alternatives. A detailed analysis of potential noise effects on Noise Sensitive Areas (NSAs) in the vicinity of the alignment was carried out for the Technically Preferred Route. An overview of the analysis is discussed in this section, and a more detailed description of the analysis is included in Appendix 2.

Road traffic sound levels in this study have been predicted using the technique developed by the U.S. Federal Highway Administration (FHWA), enhanced by the Ministry of Transportation and the Ministry of Environment and Energy. The computerized version of the ORNAMENT Model, STAMSON 5.03, was used in calculating the predicted sound levels. The ORNAMENT/FHWA models have been used extensively in Ontario since the early 1980's in the preparation of Environmental Assessments of provincial and municipal roadway undertakings.

The calculations are primarily based on the average daily traffic (AADT) volumes, percentage of medium and heavy trucks, posted speed limits, road to receptor distance, elevation differential between the road and the receptor, roadway gradient, pavement type and the type of ground cover between the road and the receptor in question. Noise levels were predicted in decibels in the A-weighted scale and averaged over a 24 hour period ( $Leq_{24}$ ).

Traffic volumes forecast as part of the travel demand analysis were used to predict future noise levels. Because the timing of the project is unknown, traffic forecasts for the Year 2021 were used, since this represented the worst-case scenario for noise effects and a realistic time period for construction of the project.

Receptors were selected based on the following factors:

- proximity to new highway (generally within 500-600 metres)
- proximity to existing roads (high ambient noise levels)
- special topographical features (elevated or depressed relative to highway profile)
- acoustical shielding (e.g. dense vegetation)
- proximity to future interchange ramps.

In certain instances, individual receptors were assumed to be representative of impacts to other homes around it.

##### Results of Analysis

Noise levels were predicted and compared for the with Highway 404 Scenario, and without Highway 404 (Future Do Nothing) Scenario. With the implementation of the undertaking, several residences may experience noise increase greater than 5 dB, and may experience resultant noise levels greater than 55 dBA. Since siting the highway avoided as many built-up areas as possible, the majority of noise impacts affect single homesteads (refer to Exhibit 5.9), however certain areas of multiple-receivers will also be impacted.

| Leq (24) Ambient | Number of houses subject to a noise increase in dBA over 2021 Do Nothing Alternative |     |      |       |     |
|------------------|--|-----|------|-------|-----|
|                  | <0 (i.e. decrease)   | 0-5 | 6-10 | 11-15 | >15 |
| 45-50 dBA        |  | 105 | 61   | 49    | 20  |
| 51-55 dBA        |  | 20  | 39   | 2     | 0   |
| 56-60 dBA        |  | 19  | 37   | 0     | 0   |
| 61-65 dBA        | 9  | 8   | 2    | 0     | 0   |
| 66-70 dBA        |  | 0   | 0    | 0     | 0   |



| Area   | NO. OF HOUSES AFFECTED |                   |                   | Opportunity For Noise Control | Type of Mitigation | Rationale/Comments  |
|--|------------------------|-------------------|-------------------|-------------------------------|--------------------|---|
|  | 0-5 dBA Increase       | 5-10 dBA Increase | > 10 dBA Increase |                               |                    |   |
| Davis Drive to Green Lane                      | -                      | 2                 | -                 | No                            | -                  | Houses are isolated; Mitigation would not be cost-effective               |
| Green Lane to York Regional Road 13            | -                      | -                 | 3                 | No                            | -                  | Houses are isolated; Mitigation would not be cost-effective               |
| York Regional Road 13 to York Regional Road 77 | 2                      | -                 | -                 | No                            | -                  | Excess is less than 5 dBA   |
| York Regional Road 13 to York Regional Road 77 | -                      | 6                 | -                 | No                            | -                  | Excessive barrier height would be required, i.e. technically not feasible |
|  | -                      | -                 | 1                 | No                            | -                  | House is isolated; Mitigation would not be cost-effective                 |
|  | 7                      | -                 | -                 | No                            | -                  | Excess is less than 5 dBA   |
|  | -                      | 5                 | -                 | No                            | -                  | Houses are isolated; Mitigation would not be cost-effective               |

| Area   | NO. OF HOUSES AFFECTED |                   |                   | Opportunity For Noise Control | Type of Mitigation         | Rationale/Comments   |
|--|------------------------|-------------------|-------------------|-------------------------------|----------------------------|--|
|  | 0-5 dBA Increase       | 5-10 dBA Increase | > 10 dBA Increase |                               |                            |  |
| York Regional Road 77 to York Regional Road 32 | 1                      | -                 | -                 | No                            | -                          | Excess less than 5 dBA   |
|  | -                      | 3                 | -                 | No                            | -                          | Houses are isolated; Mitigation would not be cost-effective  |
|  | -                      | 5                 | -                 | Yes                           | Sound Barrier Wall         | Houses are too far away for mitigation to be cost-effective  |
|  | -                      | -                 | 5                 | No                            | -                          | Houses are isolated; Mitigation would not be cost-effective  |
| York Regional Road 32 to York Regional Road 8  | -                      | 1                 | -                 | No                            | -                          | House is isolated; Mitigation would not be cost-effective  |
|  | -                      | -                 | 3                 | No                            | -                          | Houses are isolated; Mitigation would not be cost-effective  |
|  | -                      | -                 | 12                | Yes                           | Sound Barrier Wall on Ramp | Sound Barrier is technically feasible and may be economically viable. Subdivision layout could be altered in the future to accommodate the Ramp. |
|  | -                      | -                 | -                 | -                             | -                          | -  |

| Area   | NO. OF HOUSES AFFECTED |                   |                   | Opportunity For Noise Control | Type of Mitigation      | Rationale/Comments   |
|--|------------------------|-------------------|-------------------|-------------------------------|-------------------------|--|
|  | 0-5 dBA Increase       | 5-10 dBA Increase | > 10 dBA Increase |                               |                         |  |
| York Regional Road 8 to York Regional Road 3 | -                      | 1                 | -                 | No                            | -                       | House is isolated; Mitigation would not be cost-effective  |
|  | -                      | 3                 | -                 | No                            | -                       | Mitigation would not be technically feasible due to excessive barrier height requirements.                                   |
|  | -                      | -                 | 4                 | No                            | -                       | Houses are isolated; Mitigation would not be cost-effective.   |
| York Regional Road 3 to Highway 48           | 7                      | -                 | -                 | No                            | -                       | Excess less than 5 dBA   |
|  | -                      | 6                 | -                 | No                            | -                       | Houses are too far for mitigation to be effective  |
|  | -                      | 2                 | -                 | No                            | -                       | Future sound level is less than Leq 55 dBA, thus mitigation is not warranted   |
| Highway 48 to York Regional Road 18          | -                      | -                 | 4                 | No                            | -                       | Houses are isolated; Mitigation would not be cost-effective  |
|  | -                      | -                 | 34                | Yes                           | Sound Barrier Wall/Berm | Elm Grove Trailer Park - Technically feasible but economically may be not viable due to excessive barrier length requirement |
|  | 3                      | -                 | -                 | No                            | -                       | Excess is less than 5 dBA  |
|  | -                      | 2                 | -                 | No                            | -                       | Houses are isolated; Mitigation would not be cost-effective  |
|  | -                      | -                 | 2                 | No                            | -                       | Houses are isolated; Mitigation would not be cost effective  |

## HIGHWAY 404 EXTENSION

Davis Drive to Highway 12

Route Planning Study and Environmental Assessment

### SUMMARY OF NOISE IMPACTS - PREFERRED ROUTE

EXHIBIT

5.9D



| Area                                | NO. OF HOUSES AFFECTED |                   |                   | Opportunity For Noise Control | Type of Mitigation      | Rationale/Comments  |
|-------------------------------------|------------------------|-------------------|-------------------|-------------------------------|-------------------------|---|
|                                     | 0-5 dBA Increase       | 5-10 dBA Increase | > 10 dBA Increase |                               |                         |   |
| York Regional Road 18 to Highway 12 | 141                    | -                 | -                 | No                            | -                       | Excess less than 5 dB;<br>(107 Receptor Locations are within Green Acres Trailer Park)                          |
|                                     | -                      | 10                | -                 | No                            | -                       | Houses are isolated and future sound levels are less than Leq 55 dBA  |
|                                     | -                      | 26                | -                 | No                            | -                       | Future sound levels are less than Leq 55 dBA  |
|                                     | -                      | 7                 | -                 | No                            | -                       | Houses are isolated;<br>Mitigation would not be cost-effective  |
|                                     | -                      | 8                 | -                 | Yes                           | Sound Barrier Wall      | Pefferlaw Estates Subdivision did not receive Draft Plan approval, thus mitigation is not an MTO responsibility |
|                                     | -                      | 28                | -                 | Yes                           | Sound Barrier Wall/Berm | Green Acres Trailer Park - Mitigation is technically feasible but economically probable                         |
|                                     | -                      | 24                | -                 | Yes                           | Sound Barrier Wall/Berm | Summer Breeze Trailer Park - Mitigation is technically feasible but economically probable                       |
|                                     | -                      | -                 | 3                 | No                            | -                       | Houses are isolated;<br>Mitigation would not be cost-effective  |

Clustered increases include:

- Proposed Pollock Estates Subdivision at Pollock Road (12 receivers potentially impacted)
- Elm Grove Trailer Park near Catering Road (34 receivers potentially impacted)
- Green Acres Trailer Park east of Pepperlaw (28 receivers potentially impacted); and
- Summer Breeze Trailer Park north of Brock Concession Road 14 (24 receivers potentially impacted).

### Mitigation

Approximately 27 of the 84 receivers assessed in the detailed noise analysis will experience noise level increases greater than 5 dBA. An increase in noise levels greater than 5 dBA generally requires that noise mitigation be considered. Where noise level increases exceed 5 dBA, MTO policy (i.e. MTO Noise Protocol) requires that:

- noise control measures within the right-of-way be investigated
- if project cost is not significantly affected, introduce noise control measures within the right-of-way
- noise control measures, where introduced, should achieve a minimum of 5 dBA attenuation over the first row of receivers (NSAs).

Given that the Technically Preferred Route has been developed only to a conceptual design level of detail the recommended noise mitigation strategy will be determined in subsequent phases of the project after approval of the EA. Typical mitigating measures include construction of berms and/or barriers, modification in the horizontal and vertical alignment of the facility, and/or the use of quieter pavements.

MTO Noise Protocol requires that only on right-of-way mitigation be investigated, and only where technically, economically and administratively feasible. Thus in several noise sensitive areas, it will be considered not practical to effectively implement noise control measures. These areas typically include houses which are isolated or too far from the right-of-way for measures such as walls or berms to be cost-effective. In addition, many of the affected houses are so far from the right-of-way that a barrier within the right-of-way would have negligible effect in lowering noise levels. A barrier will provide the greatest benefit if it significantly breaks the line of sight between the freeway and the receiver.

It should be noted that once this EA is approved and the corridor designated by the MTO, noise mitigation for any subsequent development of an NSA (homes, hospitals, etc.) impacted by the freeway becomes the responsibility of the developer. The developer would have to adhere to current provincial and applicable municipal noise guidelines.

MTO will prepare a detailed Noise Impact Assessment Report and submit the Report to the Director of the Approvals Branch of MOEE at least 3 months prior to the start of construction of the facility or any part thereof.

The Report will re-assess the potential noise impacts at all sensitive locations along the recommended route. At locations where the increases in noise levels will exceed 5 dB and where MTO is directly responsible for providing mitigation, the Report will contain a description of the control measures which will be applied and of their anticipated acoustical effectiveness. If control measures are not applied, reasons



(technical/economic) must be given. In addition, locations subject to mitigation by residential developers should be clearly indicated.

### **Construction Noise**

Future construction activities will have the potential to result in temporary noise level increases (particularly in areas previously described as noise sensitive). At the design phase, MTO will carry out the following commitments:

- Identify noise sensitive areas.
- Applicable municipal noise control by-laws will be identified. Where timing constraints, or any other municipal by-law may cause hardship to MTO, an exemption will be sought.
- The construction noise and vibration control measures will be specified in the Design and Construction Report and also included in the Detailed Noise Impact Assessment Report, which will be submitted to the Approvals branch of MOEE.
- An initial complaint from the public will require verification by MTO that the general noise control measures agreed to are in effect; MTO will investigate all noise concerns, warn the contractor of any problems, and enforce its contract.
- Notwithstanding compliance with the "general noise control measures", a persistent complaint will require a contractor to comply with MOEE sound level criteria for construction equipment contained in the MOEE Model Municipal Noise Control By-Law. Subject to the results of field investigations, alternative noise control measures will be required, where these are reasonably available.
- In selecting the appropriate construction noise control and mitigation measures, MTO will give consideration to the technical, administrative and economic feasibility of the various alternatives.
- Where pile driving or blasting may be necessary in noise sensitive areas, monitoring will be determined and adopted by MTO policy pursuant to prevailing provincial legislation at the time of construction.

### **5.4.3.3 Aesthetics**

The extension of Highway 404 will introduce a new element to the study area landscape as such, parts of the route will be visible to existing and future residents. To reduce the aesthetic effects, the route was located to avoid built-up areas and to follow as much as possible the existing ground profile.

River crossings and grade separations will be designed in an aesthetically pleasing manner using clean, simple, low-profile lines, long spans and tapered piers, where appropriate. Visual appeal to motorists and to those who may see bridges from below will be a significant factor in selecting and detailing the bridge design.

### **5.4.4 Economic Environment**

#### **5.4.4.1 Agricultural**

In terms of area, agriculture is the land use most affected by the undertaking (approximately 700 ha affected in total). The majority of the impacts to agricultural operations involve minor (less than 25% of total farm area) land taking, which do not impact the viability or operations of the farm. For details, refer to Appendix 8.



The undertaking will displace approximately 410 ha of productive soils, including 228 ha of Class 1-2 soils and 98 ha of Class 3-4 soils, 32 ha of Class 5-7 soils and 52 ha of organic soils. This displacement represents a permanent loss of this resource.

The undertaking displaces or otherwise disrupts the operations of 37 agricultural operations. Ten operations are displaced, which include two beef operations, three cash crop operations, one greenhouse, one horse farm two pasture/forage farms and one abandoned farm. In addition, twenty-seven operations are disrupted, including three specialty crop operations, seven beef operations, twelve cash crop operations, two dairy operations, one swine operation, one greenhouse and one horse farm.

On the basis of level of capital investment, which considers the size and condition of the farm complex, no high value operations are displaced, while three are disrupted; one medium value operation is displaced and two are disrupted; nine low value operations are displaced, while twenty-two are disrupted.

The total area of agricultural use impacted by the preferred route represents approximately 5% of the current agricultural production area in East Gwillimbury, Georgina and Brock. The impacts to the agricultural operations will therefore not significantly affect the local agricultural economy in northern York and Durham Regions.

On-going consultation with OMAFRA was part of the route generation and route refinement processes. In these discussions, they identified the following areas of concern:

- Agricultural Policy Areas (i.e. Canada Land Inventory Class 1 to 3 agricultural soils and specialty crop areas) should be mapped and avoided, where possible;
- farms with a high level of capital investment (i.e. buildings, tile drainage systems) should be avoided, where possible;
- organic farms should be mapped and evaluated in a similar manner to the other operations; and
- sod farms should not be given preferential value over other cultivated crop systems.

These issues were incorporated in the generation, analysis and evaluation of route alternatives, as well as refinements to the preferred route.

Impacts of dust (during construction) on tender fruits and vegetables planted on agricultural lands in close proximity to the new facility was noted as a concern by MOEE. Dust control provisions will be included in construction contracts. MTO has a statutory obligation to maintain safe highways; the Ministry will continue to research alternative methods and materials for de-icing.

#### **5.4.4.2 Commercial/Industrial**

The majority of commercial and industrial businesses in the study area are located within the urban areas and hamlets. As a result, only two major business uses are directly impacted by the preferred route, Boadway Drilling and Quinn's Marine.

Quinn's Marine is situated immediately south of Highway 48 at the Pefferlaw Brook. Refinements to the preferred route have been completed in the vicinity of the Pefferlaw Brook crossing in an effort to maintain this business. The owners are committed to staying in business at their present location, and have been cooperating

with the Project Team to ensure that sufficient lands and water access remain to maintain the viability of core business operations.

During the design phase, specific property and water access requirements will be identified in consultation with the marina owners. The following objectives will apply:

- Identify surplus lands in the immediate vicinity of the marina which would enable relocation of the existing showroom/office building;
- Provide sufficient waterfront access clear of the proposed structures for boat launching and retrieval;
- Consider opportunities for providing docking space beneath the proposed structures; and,
- Minimize impacts to business operations during construction.

Boadway Drilling is located on the west side of Highway 48, at the location of the future Highway 404 interchange south of Sutton. Various highway alignment refinements were attempted in the area but due to the close proximity of the preferred Black River crossing and property requirements of the interchange, there was no way to avoid the business.

The impacts to this business are primarily the displacement of equipment sheds. Property and relocation costs will be negotiated in advance of construction.

#### **5.4.4.3 Contaminated Sites**

The preferred route avoid all known landfill sites in the study area. Nevertheless, if during the design and construction stages, contaminated sites are encountered, MOE will be contacted for assistance. If petroleum products are encountered during excavation, care will be taken to ensure that injury or groundwater contamination do not occur.

#### **5.4.5 Cultural Environment**

##### **5.4.5.1 Archaeology**

Archaeological site data were collected from three sources: Ministry of Citizenship, Culture and Recreation (MCzCR) site database, a heritage workshop, and field visits and interviews with certain residents of the study area subsequent to the heritage workshop. According to the archaeological database of MCzCR, there are 107 registered and seven unregistered archaeological sites in the study area. Selection of the preferred route attempted to minimize impacts to known sites and to lands with moderate to high archaeological potential, namely the Lake Algonquin beach ridge and upland areas.

Only one known archaeological site may be impacted by the preferred route. It is the Lindensmith site (BbGu-8), located east of the proposed right-of-way south of Glenwoods Avenue. It is a Paleo-Indian site and will require salvage excavation if updated survey places it within the right-of-way. Four highly significant sites (Deavitt, Udora, Uxbridge Ossuary and Harshaw Village) in the study area will not be impacted by the preferred route. In addition, no known cemetery will be impacted.

The inventory of registered sites is based on relatively limited field assessments by research and consulting archaeologists; some site information, particularly degree of site disturbance and precise location, may be inaccurate. Less than one percent of the preferred route has been subjected to licensed archaeological investigation. For these



reasons, a full-coverage archaeological assessment (according to MCzCR Technical Guidelines for Stage 1-3 Archaeological Assessments (1993)) of the proposed right-of-way will be undertaken as early as possible during design to identify significant archaeological sites. Newly discovered, highly-significant sites within the proposed right-of-way (e.g. Huron ossuary or village) will be avoided if possible, highway design permitting. Significant sites that cannot be avoided will be salvage excavated prior to construction.

#### 5.4.5.2 Heritage

For the detailed assessment of the proposed right-of-way and associated study area impact zones, survey work was undertaken to identify affected cultural heritage resources. This work assisted in the determination of the significance of the impact and deriving general principles and measures for mitigating predicted adverse impacts.

All standing buildings and structures, including above ground ruins, that were visible and built before 1956 were inventoried. Cultural landscape units were also inventoried. The Ontario Ministry of Citizenship, Culture and Recreation (MCzCR) guidelines and advisory notes advise that an adverse effect on man-made heritage may be defined as one or more of the following conditions:

- destruction or unsympathetic alteration of all or part of a cultural property;
- isolation of a cultural property from its surrounding environment; or
- introduction of physical, visual, audible, or atmospheric elements that are not in character with a cultural property and its setting".

Accordingly, two types of potential adverse effects to cultural heritage features were identified: "displacement" and "disruption".

Within the right-of-way there are twelve (12) built heritage features that have the potential to be displaced. These comprise two outbuildings, (one of log construction), four residences (three of pre-1900 and one post 1900 construction), two silos, two barns, one barn foundation and an unidentified structure. These features are considered to be typical, vernacular structures, generally of a rural character, none of which are of unique or exceptional heritage significance.

There are also eight (8) cultural landscapes located within the right-of-way (all roadscapes) that have the potential to be displaced. All are considered to be typical and representative features of the rural landscape, none of which are of unique or exceptional heritage significance.

Accordingly, the proposed route is considered to entail minimal losses of, and few adverse impacts to, cultural heritage resources. Details of the heritage impacts associated with the preferred route are included in Appendix 4.

Mitigation measures for potential impacts to cultural heritage resources will take into consideration MCzCR guidelines.



## 5.5 PROCESS FOR ADDRESSING NEW CONCERNS

The Ministry of Transportation (MTO), in submitting this Environmental Assessment to the Ministry of Environment and Energy (MOEE), has attempted to provide as much detail as possible about both the undertaking itself, and the anticipated net environmental impacts. After approval under the Environmental Assessment Act is granted for an undertaking, the standard approach is to initiate further technical investigations during the design phase of the project. In addition to the more detailed technical work, further consultation with all stakeholders is also undertaken at that time. Issues and concerns which are raised during the detail design are documented and addressed in Design and Construction Reports, which are filed for information purposes prior to any construction.

Although MTO has attempted to be as thorough as possible, there is a possibility that the design may identify significant environmental impacts which may not have been anticipated in the Environmental Assessment Report. These impacts may fall into either of two categories. The first category includes changes to the proposed undertaking which are required because of new information resulting from the design engineering and environmental investigations. The second category includes short-term impacts which result from construction staging of the undertaking. The staging of construction is dependent upon financial resources, provincial priorities, and realized growth in demand, and can only be determined during the design phase.

MTO is committed to addressing the environmental concerns resulting from this undertaking whether identified in the Environmental Assessment Report or during the design phase prior to construction. MTO will screen all component projects of this undertaking during their design for new concerns. *New concerns are defined to include only those concerns which have not already been identified in this Environmental Assessment Report.*

If MTO determines that a new concern is significant, then the Ministry will conduct the detail design for the affected component project of the undertaking under the Provincial Highways Class Environmental Assessment process. This formal process includes the preparation of an Environmental Study Report in place of a Design and Construction Report, and provides the opportunity for formal agency and public review. Provisions within the Class Environmental Assessment allow for a "bump-up" to an individual Environmental Assessment, should serious environmental concerns remain unresolved.

The intent of preparing an Environmental Assessment well in advance of construction is to allow for planned development within the study area while still protecting a route for the highway. *Therefore, where Class Environmental Assessment provisions are exercised, their application will be limited to the design and construction details related to the identified concern only and will not provide the opportunity to re-examine the route location or the balance of the design.*

## 5.6 SUMMARY OF ENVIRONMENTAL EFFECTS, PROPOSED MITIGATION, COMMITMENTS TO FURTHER WORK

Exhibit 5.10 summarizes environmental effects, proposed mitigation and commitment to future works. Details of site specific impacts and proposed mitigation are presented in Sections 5.2 and 5.4.

## 1.0 Transportation

### 1.1 Traffic Operations

#### Potential Effect

- Proposed highway will allow traffic to move more efficiently through study area.

#### Proposed Mitigation/Commitments to Future Work

- Monitor traffic volumes on road network; stage construction to meet traffic warrants.

#### Concerned Group/Agency

- MTO, Municipalities, Public

#### Section Reference

- 5.2.8 and 5.2.12

### 1.2 Network Compatibility

#### Potential Effect

- Proposed highway will reduce volumes and improve operations on existing road network; undertaking is compatible with future road network which will further improve operations as network is upgraded.

#### Proposed Mitigation/Commitments to Future Work

- Monitor traffic volumes on road network; stage construction to meet traffic warrants.

#### Concerned Group/Agency

- Municipalities, Public

#### Section Reference

- 5.2.8 and 5.2.12

### 1.3 Cost

#### Potential Effect

- Proposed undertaking estimated to cost approximately \$222 million;

#### Proposed Mitigation/Commitments to Future Work

- During design, examine opportunities for cost efficiency without increasing impacts.

#### Concerned Group/Agency

- MTO, Public

#### Section Reference

- 5.2.13

## ENVIRONMENTAL ISSUES AND COMMITMENTS

## 2.0 Socio-Economic Environment

### 2.1 Property Impacts

#### Potential Effect

- Displacement and disruption of private property, residences and agricultural operations.

#### Proposed Mitigation/Commitments to Future Work

- Property impacts compensated at fair market value; consider advance purchases for those property owners which qualify.

#### Concerned Group/Agency

- Public

#### Section Reference

- 5.2.6 and 5.4.3.1

### 2.2 Community Mobility

#### Potential Effect

- Individuals may experience out-of-way travels as a result of highway crossing existing roads.

#### Proposed Mitigation/Commitments to Future Work

- Grade separations will be constructed at most roads. Four roads are planned to be closed. These roads are discontinuous and carry low volumes.

#### Concerned Group/Agency

- Municipalities, Public

#### Section Reference

- 5.2.4

### 2.3 Recreational Trails

#### Potential Effect

- Severance of existing trails

#### Proposed Mitigation/Commitments to Future Work

- During design opportunities for accommodating a trail under the Black River Crossing will be examined.
- Consultation with local snowmobile clubs will occur during design

#### Concerned Group/Agency

- Snowmobile Clubs, Public

#### Section Reference

- 5.4.3.1

### 2.4 Noise

#### Potential Effect

- Increased Noise.

#### Proposed Mitigation/Commitments to Future Work

- Detailed noise studies will be carried out during the design phase and appropriate mitigation measures will be determined.

#### Concerned Group/Agency

- MOEE, Municipalities, Public

#### Section Reference

- 5.4.3.2

## ENVIRONMENTAL ISSUES AND COMMITMENTS



## 2.0 Socio-Economic Environment (cont'd)

### 2.5 Commercial Displacement

#### Potential Effect

- Displacement of Quinn's Marine existing showroom and part of waterfront access.
- Displacement of Boadway drilling

#### Proposed Mitigation/Commitments to Future Work

- Consult with Quinn's Marine during the design phase to minimize impacts to the business (i.e. identify surplus land, relocate docking space, etc.)
- Business impacts compensated at fair market value.

#### Concerned Group/Agency

- Business Owners

#### Section Reference

- 5.4.4.2

### 2.6 Agricultural Impacts

#### Potential Effect

- Loss of prime Agricultural Land.
- Impacts to farm vehicle movement.
- Impacts to tile drainage system.
- Dust (during construction) and salt spray impacts to tender fruits and vegetables planted on agricultural lands in proximity to the new facility.

#### Proposed Mitigation/Commitments to Future Work

- Impact reduced through planning. Opportunities for further reduction will be considered during detail design.
- Grade separations have been provided at most road crossings to allow for farm vehicle movement across the highway.
- Consultation with affected farm owners will occur during design to assess tile drainage impacts. Measures will be implemented to ensure that tile drainage systems are not detrimentally impacted.
- Continue to research and test alternative deicing materials and methods.
- Include dust control provisions in construction contracts.

#### Concerned Group/Agency

- OMAFRA, Farm Operators

#### Section Reference

- 5.4.4.1

### 2.7 Contaminated Sites

#### Potential Effect

- Excavation of contaminated soils

#### Proposed Mitigation/Commitments to Future Work

- MOEE will be contacted for assistance in handling and disposal of contaminated soils.

#### Concerned Group/Agency

- MOEE, Municipalities, Public

#### Section Reference

- 5.4.4.3

## ENVIRONMENTAL ISSUES AND COMMITMENTS

### 3.0 Natural Environment

#### General Commitment

At the outset of the design phase, the proponent will meet with MNR, LSRCA, and DFO staff to discuss concerns, review and update their workplan to current standards, policies, regulations, and approval requirements, and obtain any new information which may be applicable to the design phase. This will include an assessment of the federal Canadian Environmental Assessment Act requirements and any additional work necessary to finalize and implement the design for the undertaking.

Prior to implementation, the proponent will identify design and construction details for the undertaking. This will include identification of the schedule, the construction activities, the impact of these activities upon adjacent lands or watercourses, and the mitigation which will be employed to minimize the impacts. The details of the construction activities will include the location of storage areas, equipment maintenance areas, dewatering areas, and access requirements.

Appropriate mitigation will be developed by the proponent during the design phase and will be reviewed with MNR, LSRCA, and the federal agencies to address their concerns and legislative requirements prior to implementation. The following sections identify specific commitments to provide appropriate mitigation for the impacts resulting from the undertaking. Appropriate refers to mitigation that is both practical and reasonable given the site conditions and the degree of impact. Appropriate also recognizes and accepts that the mitigation for one factor may result in additional impacts to another factor. For example, the installation of fencing below grade to discourage wildlife movement will cause some disturbance to vegetation.

### 3.1 Fisheries and Aquatic Habitat

#### Potential Effect

- Specific impacts and mitigation measures for individual crossings are listed in Exhibit 5.6.
- Specific fisheries mitigation measures are not required for 27 of the crossings along the technically preferred route with no fish habitat as there will be no impacts from the highway. Standard measures that address environmental protection and site restoration at the construction phase would still be applied.
- For the majority of crossing that sustain a low impact from the highway, mitigation measures include the installation of culverts to maintain fish passage opportunities and the conveyance of flow. As mentioned previously, it is anticipated that bridged crossings will not have piers placed within the channel resulting in a low impact, although that possibility exists for the crossing of Pepperlaw Brook. This design will require confirmation at the design stage.
- Fisheries mitigation measures for those crossings that will have a moderate impact from the highway are not feasible. These are crossings of dug ponds where the habitat will be lost through filling. Since these ponds are artificial and on private land, and there exists the opportunity for the landowners to remove them at their own discretion, we have not considered their loss to be a harmful alteration and compensation would not be required for their loss.
- For the five crossings that sustain moderate to high impacts, mitigation measures include the installation of culverts to maintain fish migration and low flow channel form. Where beneficial, natural substrate be incorporated into the culvert bottom to maintain spawning or feeding opportunities. Federal authorization under the Fisheries Act will likely be required for the alterations to the habitats at crossings noted on Exhibit 5.6, but this will be confirmed at the design stage.
- For the four crossings that will have a high impact from the construction of Highway 404, mitigation measures include the installation of open bottom culverts to maintain groundwater discharge potential, substrates, fish passage, feeding habitat and low flows. Compensation will likely be required for the loss or alteration of habitats including potential spawning habitat for pickerel, low lying, grassy areas suitable for pike spawning as well as refuge habitat (undercut banks and overhanging vegetation) but specific requirements would be confirmed at the design stage.

## ENVIRONMENTAL ISSUES AND COMMITMENTS



### 3.0 Natural Environment (cont'd)

#### 3.1 Fisheries and Aquatic Habitat (cont'd)

##### Proposed Mitigation/Commitments to Future Work

Mitigation will include the following commitments wherever appropriate:

- bridge and culvert designs that:
  - maintain the existing channel form or include a low flow channel where appropriate;
  - do not impede fish movement;
  - do not place piers within the channel as defined by bankfull flow conditions, or are oriented in the direction of water flow to maximize hydraulic efficiency during high flow conditions;
  - minimize erosion and flood risk upstream and downstream of structure;
  - utilize open bottomed culverts in upwelling areas.
- plans that maximize the riparian vegetation protection and the re-establishment as soon as possible after disturbance;
- plans that minimize the disruption to natural systems and maintain slope stability when developing access roads for construction, including re-establishment or stabilization after construction;
- plans that provide for watercourse realignments in dry;
- timing constraints to restrict construction activities immediately adjacent to or within watercourses to low flow months and that avoid sensitive spawning periods;
- contract specifications that require the preparation of sedimentation and erosion control plans, which provide details of implementation, monitoring, and commitment to undertake modifications where necessary during construction to maintain effectiveness.

##### Concerned Group/Agency

- MNR, DFO, LSRCA, Municipalities, Interest Groups, Public

##### Section Reference

- 5.4.2.1 and Exhibit 5.6

#### 3.2 Vegetation

##### Potential Effect

- Specific impacts and mitigation measures for individual features are listed in Exhibit 5.7.
- Encroachment: where a woodlot or wetland lies within 100 m of the ROW but none of the vegetation is actually removed. Impacts relate to the effect of noise, fumes, and runoff on the natural vegetation.
- Edge Effects: the ROW removes edge of a woodlot, reducing the overall patch size but still keeping the remaining portion as a single unit. Opening the edge of the patch permits secondary injury to the remaining vegetation, and also permits the invasion of exotic species which reduces the quality of the native plant community.
- Fragmentation: the ROW passes through the interior of a woodlot or wetland leaving patches that are separated by the ROW, but large enough to function as intact communities. Removing the same area of vegetation from the interior of a woodlot as compared to removing an edge is potentially a much greater impact because two new edges are created, and the potential for interior habitat important to area-sensitive species is reduced. In addition, road mortality for wildlife may be higher due to isolated wildlife populations trying to cross the road.
- Total removal of a feature: the entire woodlot or wetland is removed by the highway.
- Break in Wildlife Corridor: the highway crosses a linear belt of vegetation (e.g., valley) which is used as a movement route by wildlife. The highway creates a dispersal barrier for some species or causes high road mortality for others.

## ENVIRONMENTAL ISSUES AND COMMITMENTS



### 3.0 Natural Environment (cont'd)

#### 3.2 Vegetation (cont'd)

##### Potential Effect (cont'd)

- Removal of portions of an existing woodlot may result in physical impacts to the portion of the woodlot which remains. Sunscald, and windthrow may cause dieback along the edge resulting in treefalls and a tangled understorey comprised of invasive species. This is most pronounced where new edges have a south or west facing exposure. The amount of dieback is dependent on age of the stand (older ones are more sensitive), species composition and the soil moisture.

##### Proposed Mitigation/Commitments to Future Work

Mitigation will include the following commitments wherever appropriate:

- edge management plans for areas of new disturbance to protect remaining trees and re-establish edge;
- salvage of existing native vegetation, seed, and topsoil for re-establishment in identified areas of significant disturbance;
- relocation of rare, threatened or endangered plant species;
- minimization of disturbance to remaining vegetation by felling trees into the working easement, and leaving stumps and roots for soil stabilization and natural regeneration, and restricting access with fencing to working areas;
- maximize forest regeneration opportunities on lands which are surplus to transportation needs as mitigation for fragmentation of significant vegetation and to provide linkage to alternate habitat.

##### Concerned Group/Agency

- MNR, LSRCA, Municipalities, Interest Groups, Public

##### Section Reference

- 5.4.2.2 and Exhibit 5.7

#### 3.3 Wetlands

##### Potential Effect

- Specific impacts and mitigation measures for individual features are listed in Exhibit 5.7.
- Encroachment: where wetland lies within 100 m of the ROW but none of the vegetation is actually removed. Impacts relate to the effect of noise, fumes, and runoff on the natural vegetation.
- Edge Effects: the ROW removes edge of a wetland, reducing the overall patch size but still keeping the remaining portion as a single unit. Opening the edge of the patch permits secondary injury to the remaining vegetation as outlined below, and also permits the invasion of exotic species which reduces the quality of the native plant community.
- Fragmentation: the ROW passes through the interior of a wetland leaving patches that are separated by the ROW, but large enough to function as intact communities. Removing the same area of vegetation from the interior as compared to removing an edge is potentially a much greater impact because two new edges are created, and the potential for interior habitat important to area-sensitive species is reduced. In addition, road mortality for wildlife may be higher due to isolated wildlife populations trying to cross the road.
- Break in Wildlife Corridor: the highway crosses a linear belt of vegetation (e.g., valley) which is used as a movement route by wildlife. The highway creates a dispersal barrier for some species or causes high road mortality for others.
- Disruption of the hydrological regime: excavation of organics and filling along the highway footprint can result in blockage of flow creating wetter conditions on one side and drier on the other. Both of these extremes will induce a change in the nature of the wetland.

## ENVIRONMENTAL ISSUES AND COMMITMENTS

### 3.0 Natural Environment (cont'd)

#### 3.3 Wetlands (cont'd)

##### Proposed Mitigation/Commitments to Future Work

Mitigation will include the following commitments wherever appropriate:

- installation of equalizer culverts to preserve dynamics of wetland hydrology by maintaining sheet flow through the wetland and facilitating wildlife crossing for small mammals and amphibians;
- delineation of areas to be protected with sediment fences to prevent intrusion during construction;
- timing constraints that restrict construction activities immediately adjacent to or within wetlands to respect the intent of the federal Migratory Bird Regulations (1994) and Ontario Game and Fish Act (1980);
- contract specifications that require the preparation of sedimentation and erosion control plans, which provide details of implementation, monitoring, and commitment to undertake modifications where necessary during construction to maintain effectiveness;
- salvage of wetland plant material to be used for re-establishment in identified areas of significant disturbance;
- minimization of dewatering within wetlands and irrigation to maximize survival in disturbed areas that will be re-established;
- retention of lands which are surplus to transportation needs for the purpose of mitigation by allowing reversion to wetland.

##### Concerned Group/Agency

- MNR, DFO, LSRCA, Municipalities, Interest Groups, Public

##### Section Reference

- 5.4.2.3 and Exhibit 5.7

#### 3.4 Wildlife

##### Potential Effect

- Specific impacts and mitigation measures for individual features are listed in Exhibit 5.7.
- The loss of natural areas represents a loss of potential breeding and foraging areas for resident wildlife, as well as migratory stopovers for migrant birds.
- General noise, air pollution and contaminated runoff as a result of encroachment of the highway as well as crossings;
- Disturbance during critical phases of breeding;
- Barriers to wildlife movement along linear corridors such as river valleys, and connected habitat over the tableland, or between differing habitat required at critical stages of the life cycle (e.g., red-spotted newts require both water to breed, and upland for the juvenile stage), and;
- Loss of habitat (breeding, forage, shelter).

##### Proposed Mitigation/Commitments to Future Work

Mitigation will include the following commitments wherever appropriate:

- bridge and culvert designs that accommodate terrestrial passage for small mammals at identified locations within specified wildlife corridors.
- at the Vachell crossing, highway design that remains elevated and permits the installation of a large box culvert with an effective opening (2m X 3m) to maintain wildlife corridor connectivity and which recognizes wildlife requirements for light and a terrestrial base, and facilitates water movement. Other culverts to be installed every 100 m or less across the forested area associated with the swamp. Identified crossings fenced with chainlink fence installed below grade to discourage small mammals and turtles and to encourage the use of the culverts.

## ENVIRONMENTAL ISSUES AND COMMITMENTS



### 3.0 Natural Environment (cont'd)

#### 3.4 Wildlife (cont'd)

##### Proposed Mitigation/Commitments to Future Work (cont'd)

- at the Morning Glory Swamp oversize and install a culvert with an effective opening (2m high by 4m wide) to maintain wildlife corridor connectivity and which recognizes wildlife requirements for light and a terrestrial base, and facilitates water movement. Other culverts to be installed every 100 m or less across the forested area associated with the swamp. Identified crossings fenced with chainlink fence installed below grade to discourage small mammals and turtles and to encourage the use of the culverts.
- restrict clearing of trees immediately adjacent to or within breeding areas for all wildlife to non-critical periods.

##### Concerned Group/Agency

- MNR, LSRCA, Municipalities, Interest Groups, Public

##### Section Reference

- 5.4.2.4 and Exhibit 5.7

#### 3.5 Groundwater

##### Potential Effect

- Specific impacts and mitigation measures for individual features are listed in Exhibit 5.8.
- Areas of highly permeable soil are considered to be sensitive to groundwater contamination due to the potentially rapid movement of contaminants through these soils. Included in this group of soils are sands and gravels of glaciolacustrine and glaciofluvial origin as well as ice contact stratified drift. Also included in this category are organic deposits such as peat and alluvial stream deposits which contain a mixture of sand, gravel as well as silt and clay.
- Areas of low permeable soil are considered to have low sensitivity. Fine grained silt, clay soils, glacial tills and glaciolacustrine deposits have low permeability and do not allow rapid movement of contaminants through them.

##### Proposed Mitigation/Commitments to Future Work

Mitigation will include the following commitments wherever appropriate:

- tilling of soil in non-vegetated areas prior to restoration to re-establish infiltration along access roads, storage areas, or other well traveled areas where soil compaction has occurred in areas that previously permitted infiltration;
- backfilling of excavations that intercept existing ground water flow with porous granular material to maintain existing ground water linkage particularly at river crossings;
- detailed stormwater management plans which address both quantity and quality;
- a well monitoring program which will involve pre-construction testing, investigation of complaints during construction, and provision of an alternate water supply.
- well abandonment will be carried in compliance with O.Reg 903; decommissioning of septic systems will be carried out in compliance with O.Reg 358 and Regional Health Units will be consulted.

##### Concerned Group/Agency

- MOEE, MNR, LSRCA, Municipalities, Interest Groups, Public

##### Section Reference

- 5.2.7, 5.4.2.5 and Exhibit 5.8

## ENVIRONMENTAL ISSUES AND COMMITMENTS



### 3.0 Natural Environment (cont'd)

#### 3.6 Stormwater Management

##### Potential Effect

- Impacts to water quality and quantity to adjacent watercourses
- Increase in erosion
- Impacts to surface and ground water, including those related to temperature and salt.

##### Proposed Mitigation/Commitments to Future Work

- Roadside ditches and the centre median will be designed to accommodate highway drainage.
- A detailed stormwater management plan will be prepared as part of the design stage. The stormwater management plan will give consideration to the MOEE 1994 Stormwater Management Guideline. The standards, policies, regulations and approval requirements in place at the time of design will govern the stormwater management provisions and approval requirements incorporated in the plan.
- Where feasible, opportunities for providing ease of containment of accident spills will be provided during the design of stormwater facilities.

##### Concerned Group/Agency

- MOEE, MNR, LSRCA, DFO

##### Section Reference

- 5.2.7

### 4.0 Cultural Environment

#### 4.1 Heritage

##### Potential Effect

- Displacement of built heritage features and cultural landscapes.
- Disruption of built heritage features and cultural landscapes through isolation, and introduction of visual, audible or atmospheric elements.

##### Proposed Mitigation/Commitments to Future Work

- Historical and architectural research will be undertaken to further assess the heritage value and significance; documentation will be undertaken in advance of demolition or relocation and agreement on any further mitigation measures agreed to with affected parties or reviewing agencies.
- Mitigation measures to ameliorate adverse impacts to affected roadsides either through closure, interchange, bridge or underpass construction may include, where appropriate:
  - retention, re-siting and/or replacement in kind of all types of fencing,
  - retention of substantial deciduous hedgerows associated with affected roadsides,
  - new ditching to be planted with grass and or marsh plantings.
- Retain a qualified heritage consultant to assess the heritage significance of any newly discovered heritage resources and recommend appropriate mitigation measures.

##### Concerned Group/Agency

- MCzCR, Municipalities, Interest Groups, Public

##### Section Reference

- 5.4.5.2

## ENVIRONMENTAL ISSUES AND COMMITMENTS

## 4.0 Cultural Environment (Cont'd)

### 4.2 Archaeology

#### Potential Effect

- Destruction of archaeological remains.

#### Proposed Mitigation/Commitments to Future Work

Mitigation will include the following commitments:

- A full-coverage archaeological assessment of the proposed right-of-way will be undertaken as early as possible during design to identify significant archaeological sites.
- Mitigation of significant archaeological remains will include:
  - avoidance (where appropriate) of cemetery sites, Iroquoian village sites and associated cemeteries/ossuaries and Paleo-Indian sites.
  - salvage excavation

#### Concerned Group/Agency

- First Nations, MCzCR, Municipalities, Interest Groups, Public

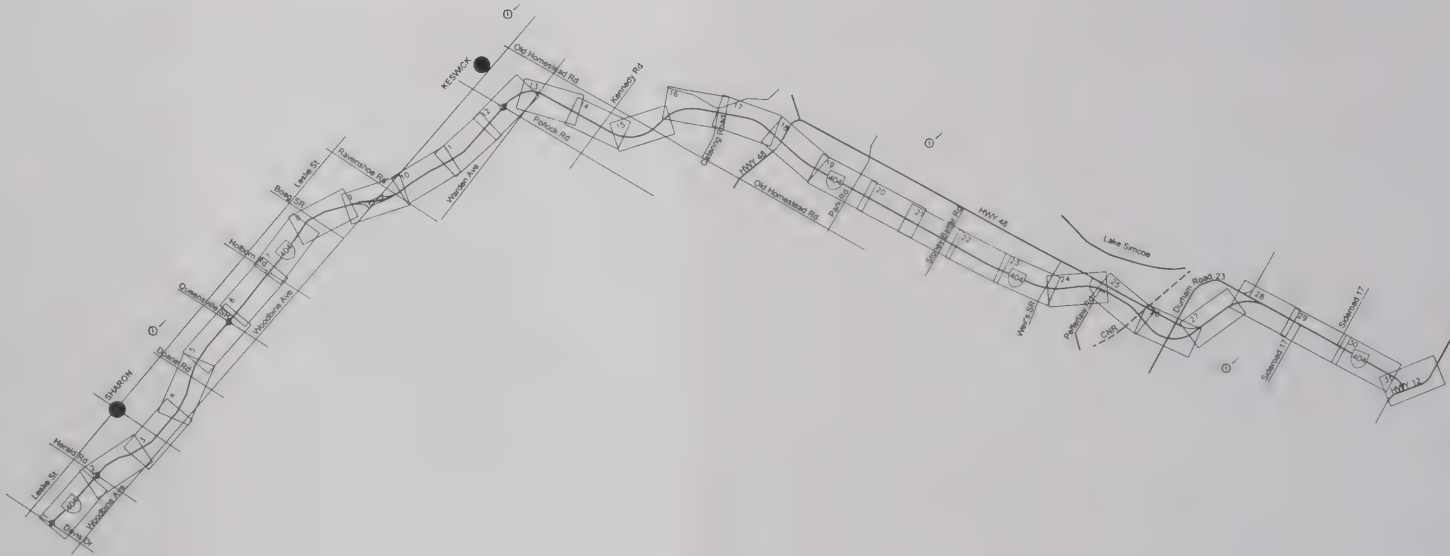
#### Section Reference

- 5.4.5.1

## ENVIRONMENTAL ISSUES AND COMMITMENTS

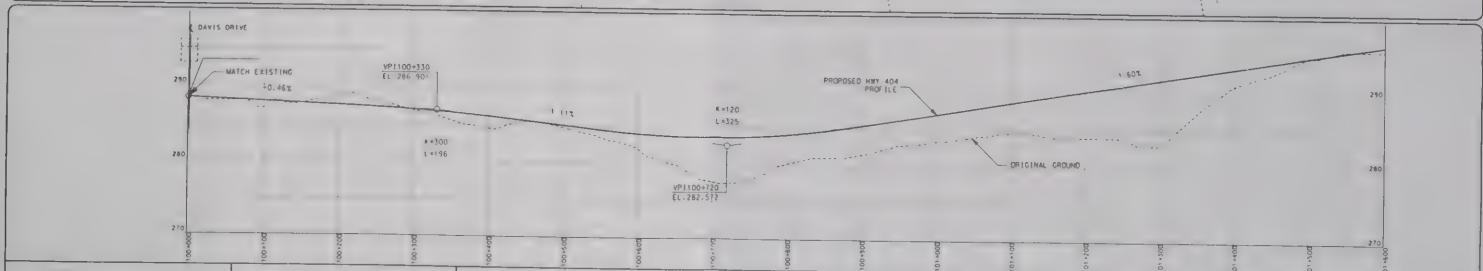
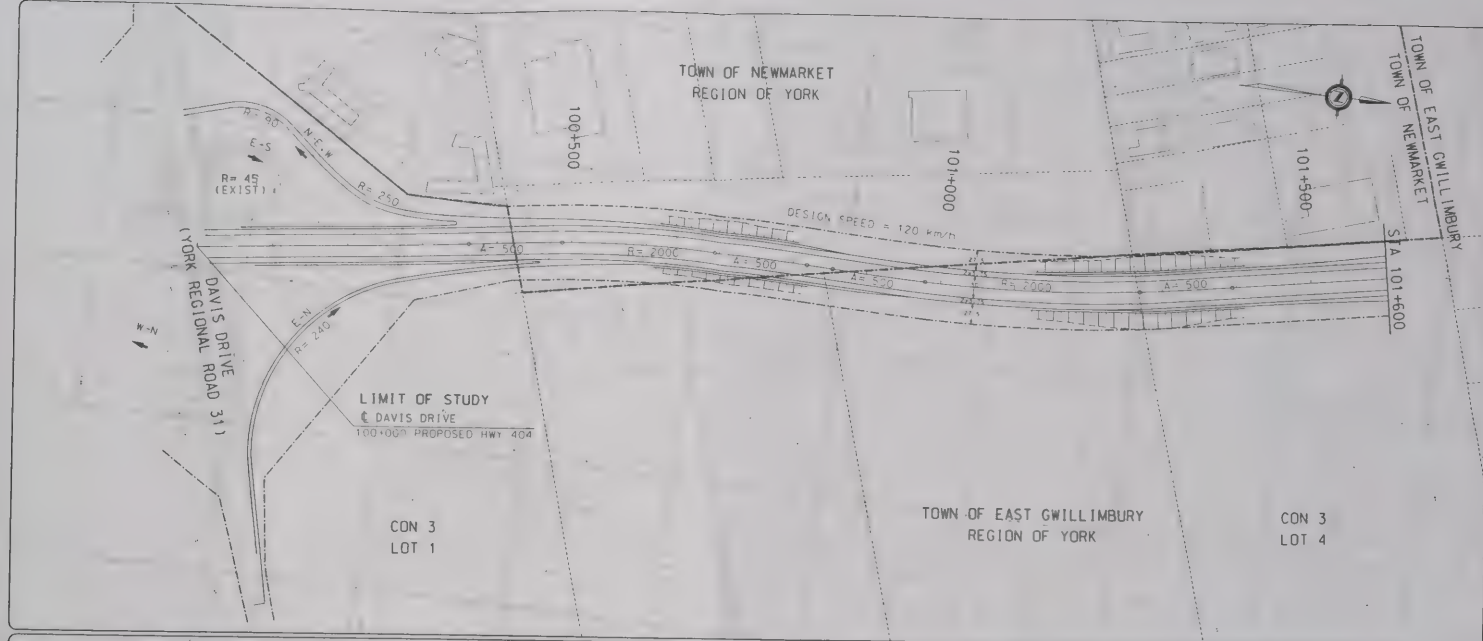
# HIGHWAY 404 EXTENSION

Davis Drive to Highway 12  
Route Planning Study and Environmental Assessment











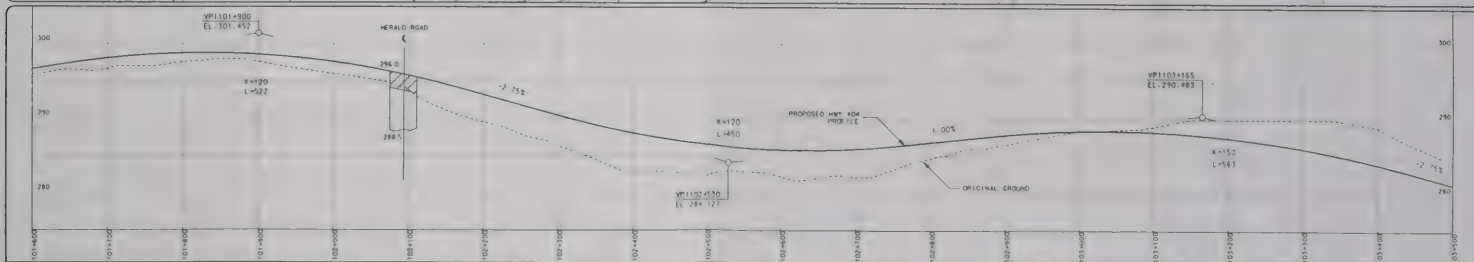
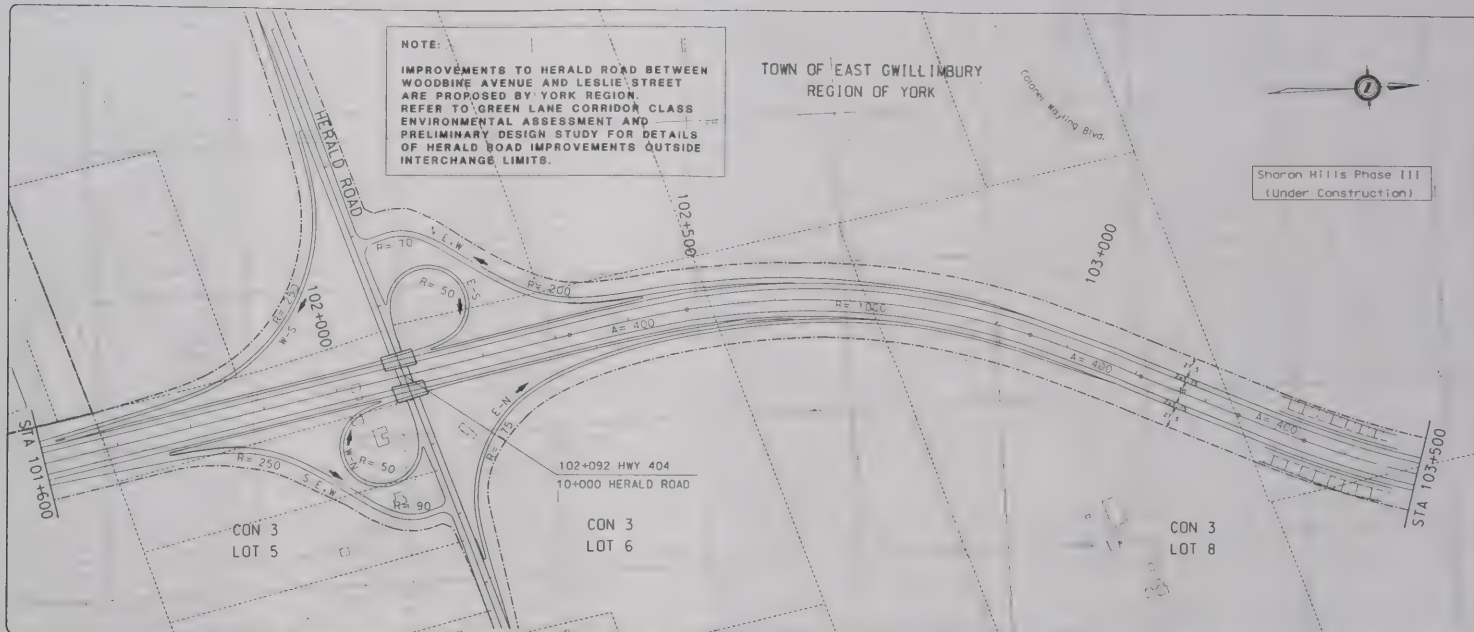


NOTE:

IMPROVEMENTS TO HERALD ROAD BETWEEN  
WOODBINE AVENUE AND LESLIE STREET  
ARE PROPOSED BY YORK REGION.  
REFER TO GREEN LANE CORRIDOR CLASS  
ENVIRONMENTAL ASSESSMENT AND  
PRELIMINARY DESIGN STUDY FOR DETAILS  
OF HERALD ROAD IMPROVEMENTS OUTSIDE  
INTERCHANGE LIMITS.

TOWN OF EAST GWILLIMBURY  
REGION OF YORK

Sharon Hills Phase III  
(Under Construction)



COLE, SHERMAN

# HIGHWAY 404 EXTENSION

Devis Drive to Highway 12  
Route Planning Study and  
Environmental Assessment



## LEGEND

Existing Property Line  
Proposed R.O.W.

## SCALE

HORIZONTAL  
0 50 100

VERTICAL  
0 6 10

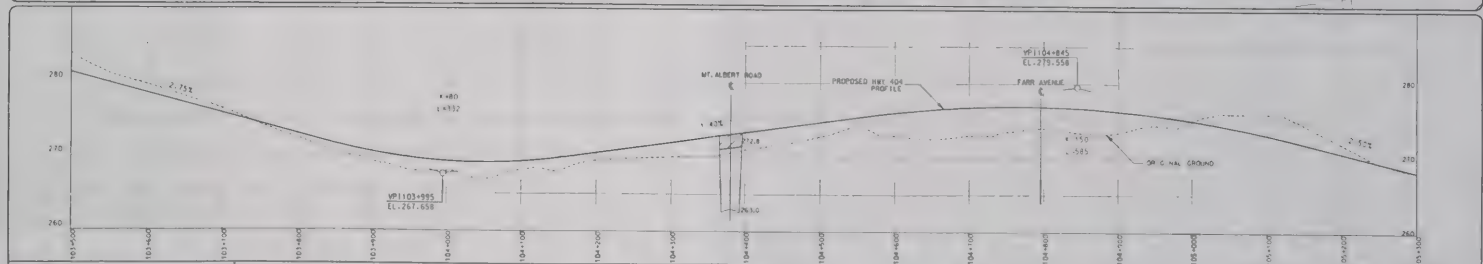
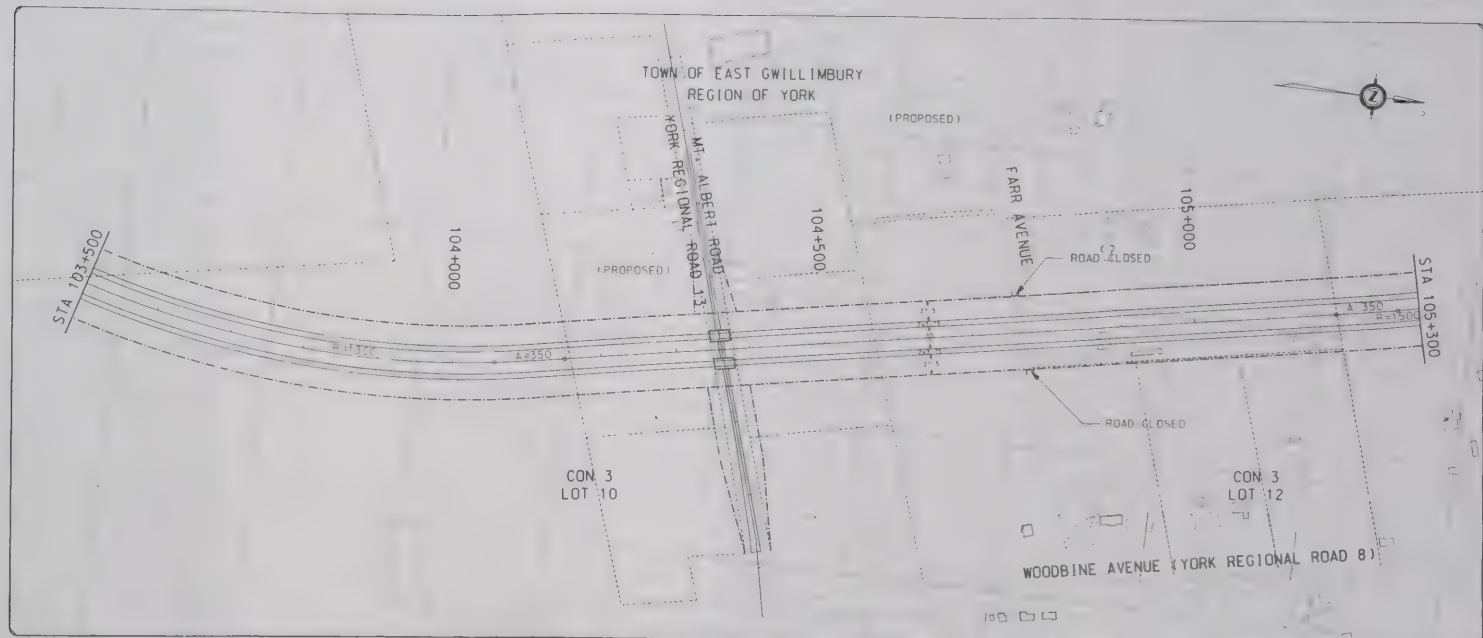
Sta 101+600 to Sta 103+500

Herald Road Interchange

PLATE

2

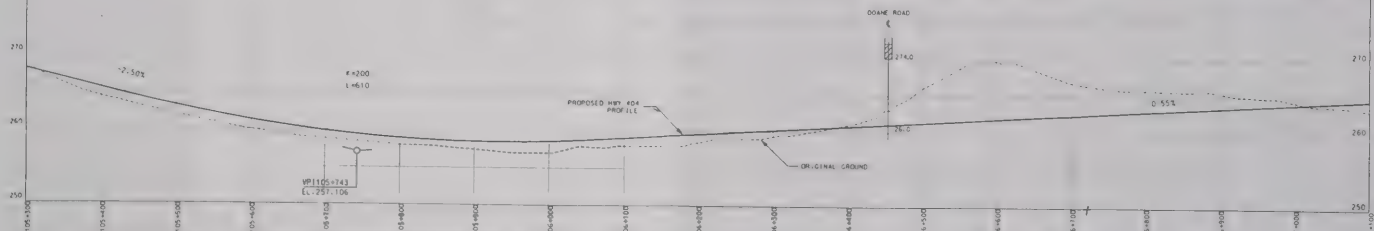








TOWN OF EAST Gwillimbury  
REGION OF YORK

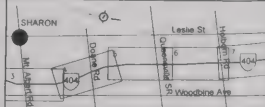


 Ontario  
Ministry of Transportation



 COLE  
SHERMAN

# HIGHWAY 404 EXTENSION



Davis Drive to Highway 12  
Route Planning Study and  
Environmental Assessment



## LEGEND

Existing Property Line   
Proposed R.O.W. 

## SCALE

HORIZONTAL   
VERTICAL 

Sta 105+300 to Sta 107+100

Doane Road

PLATE

4





TOWN OF EAST GWILLIMBURY  
REGION OF YORK

CON 3  
LOT 17

107+500

108+000

108+500

STA 108+900

NOTE:

A NEW ROADWAY FACILITY LINKING  
HIGHWAY 400 AND HIGHWAY 404 IS  
PROPOSED BY MTO. REFER TO THE  
BRADFORD BYPASS ENVIRONMENTAL  
ASSESSMENT FOR DETAILS OF  
INTERCHANGE CONFIGURATIONS AND  
PROPERTY REQUIREMENTS.

CON 3  
LOT 20

CON 3  
LOT 21

108+518 HWY 404  
10+000-QUEENSVILLE SIDEROAD

QUEENSVILLE SIDEROAD  
(YORK REGIONAL ROAD 77)

QUEENSVILLE SIDEROAD

270

260

250

240

230

220

210

200

270

260

250

240

230

220

210

200

VP1107+400  
EL. 266.735

K=1500  
L=525

-0.50%

PROPOSED HWY 404  
PHW 101

270

260

250

240

230

220

210

200

270

260

250

240

230

220

210

200

190

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260

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230

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190

270

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230

220

210

200

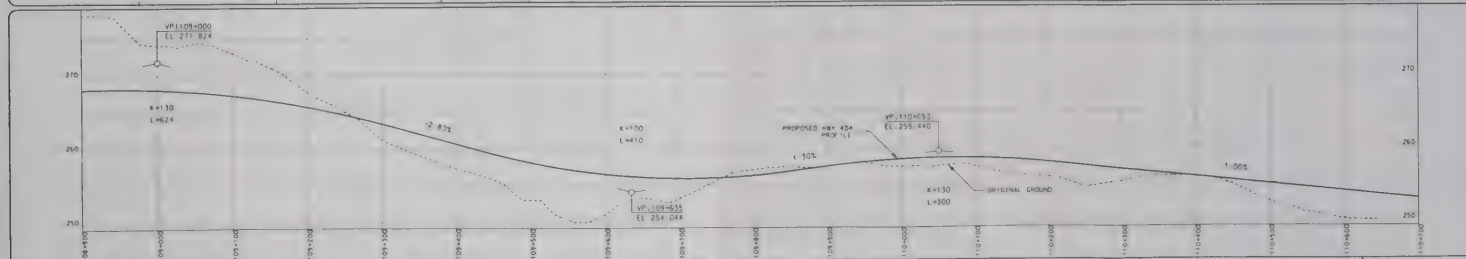
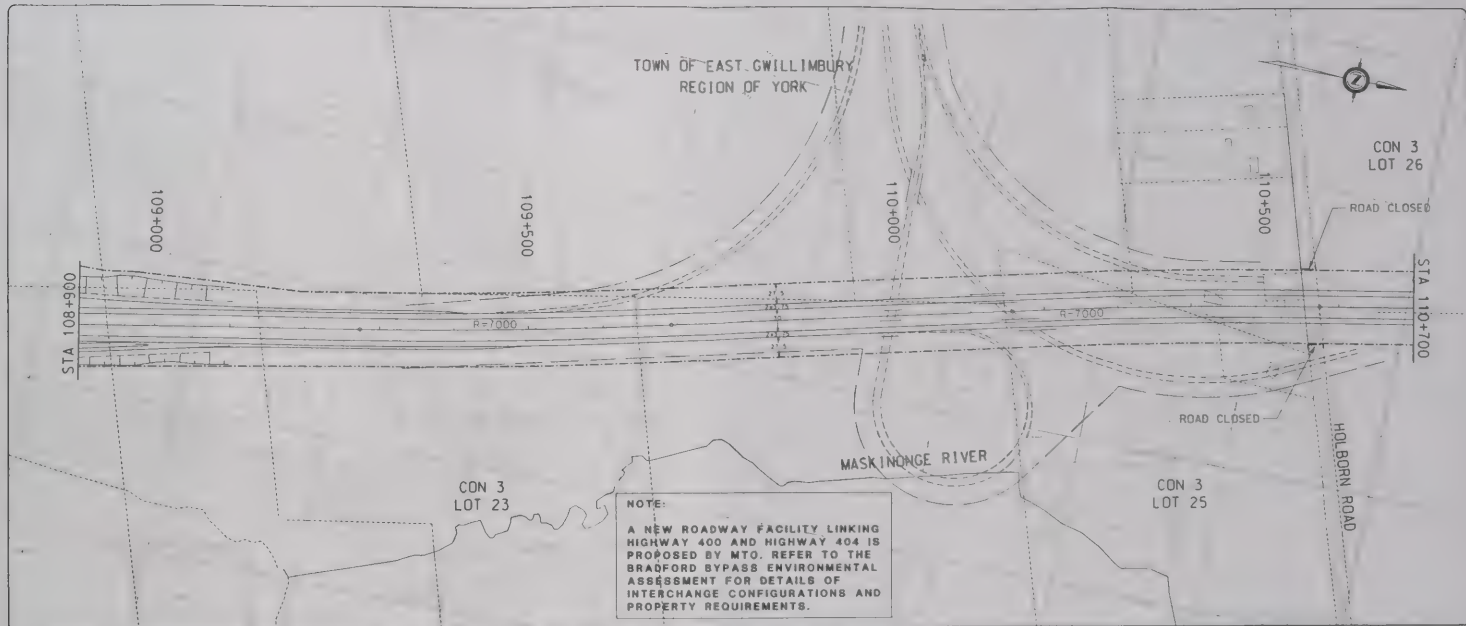
190

270

260

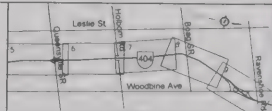
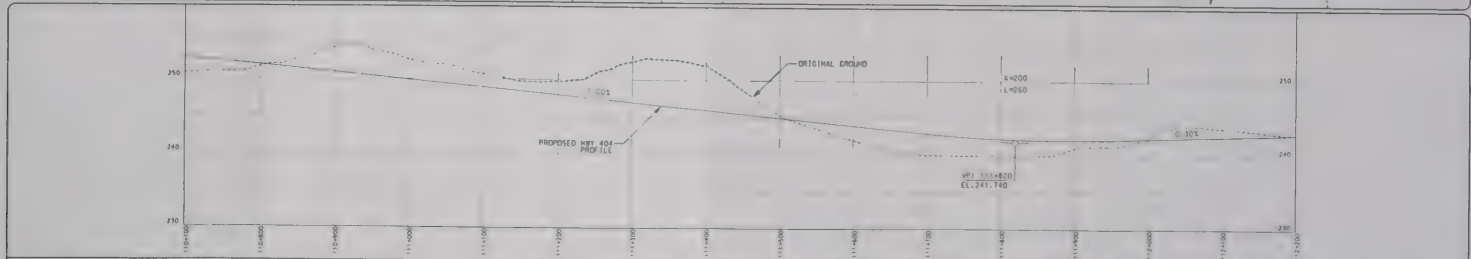
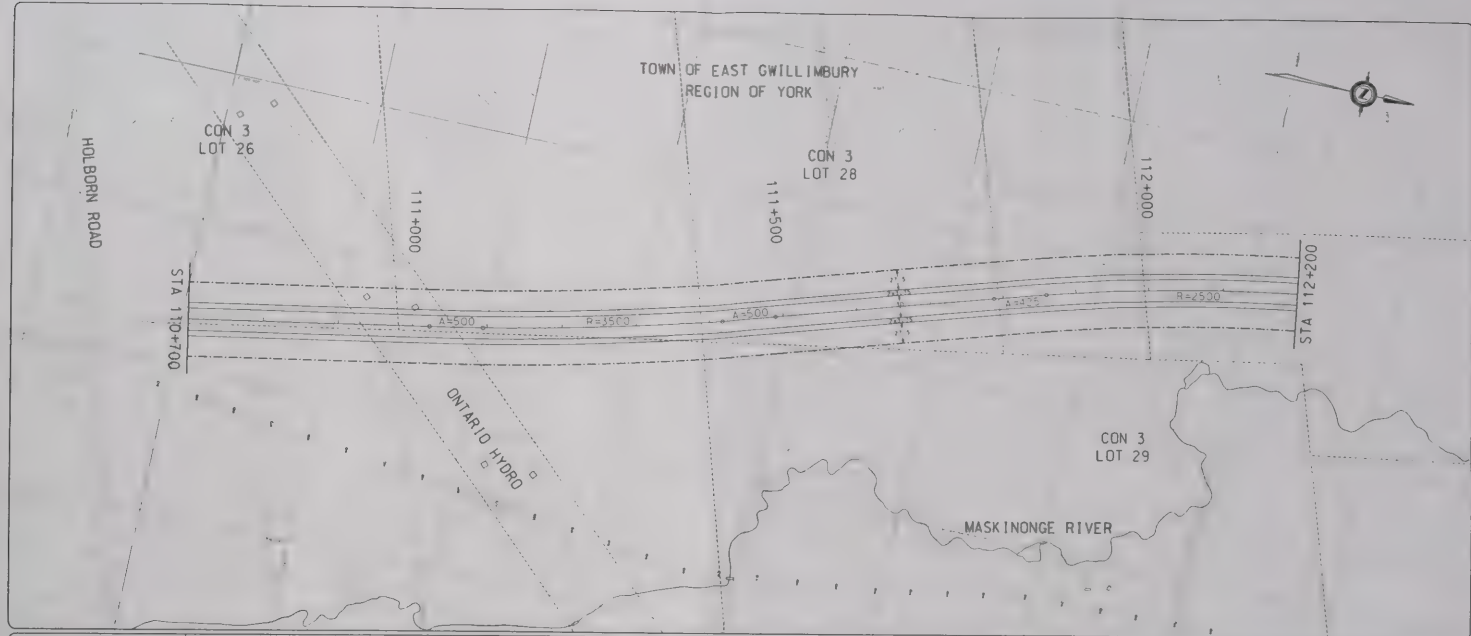
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LEGEND

Existing Property Line  
Proposed R.O.W.

SCALE

HORIZONTAL 0 50 100

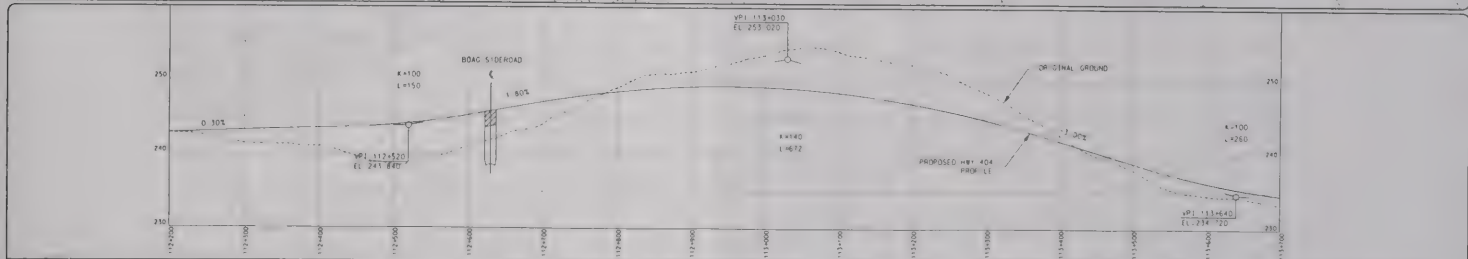
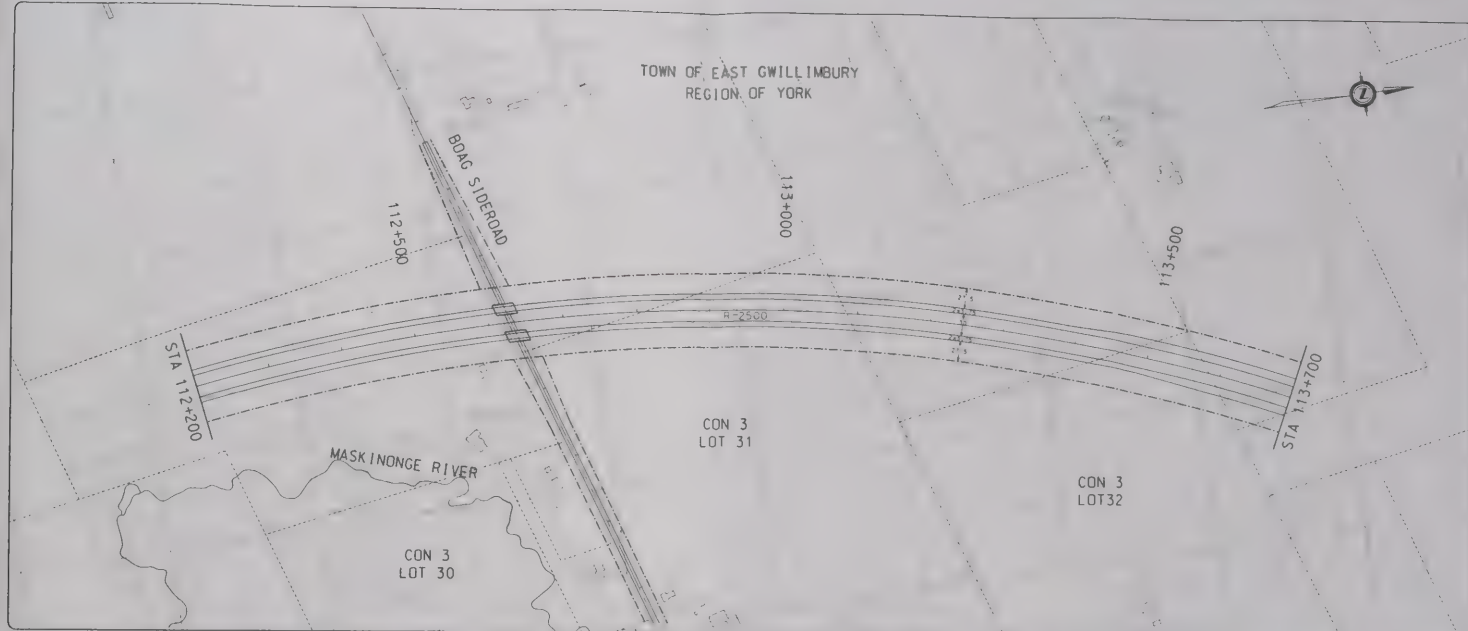
VERTICAL 0 5 10

Sta 110 + 700 to Sta 112 + 200

PLATE







LEGEND

Existing Property Line  
Proposed ROW

SCALE

HORIZONTAL  
0 50 100

VERTICAL  
0 5 10

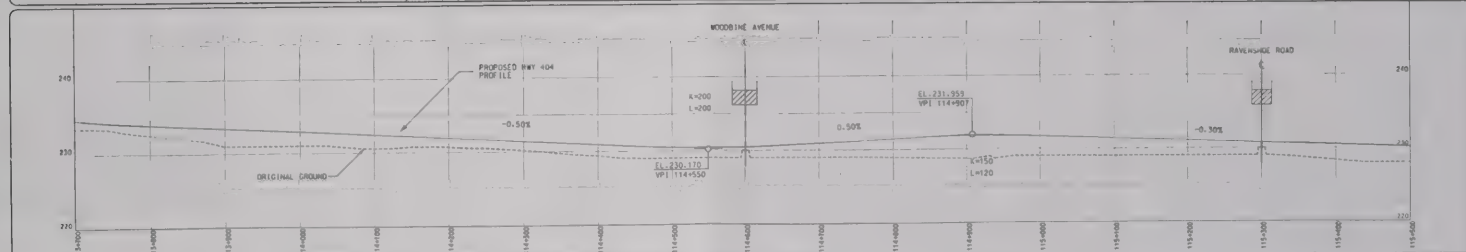
Sta 112+200 to Sta 113+700

Boag Sideroad

PLATE

8

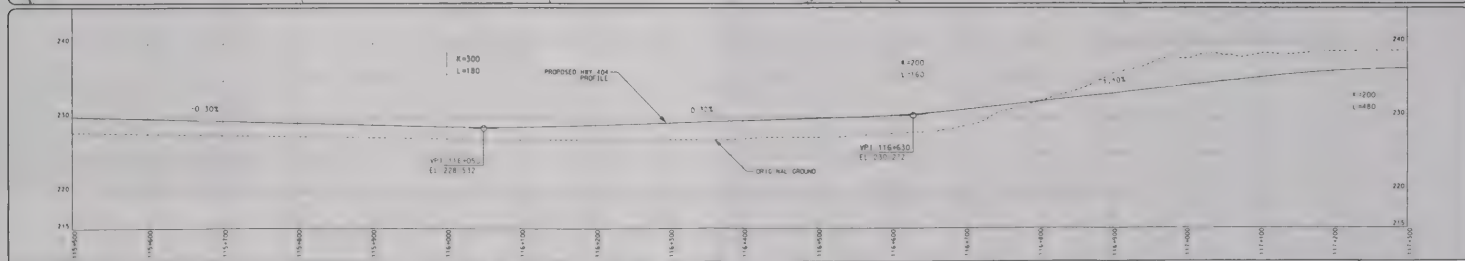
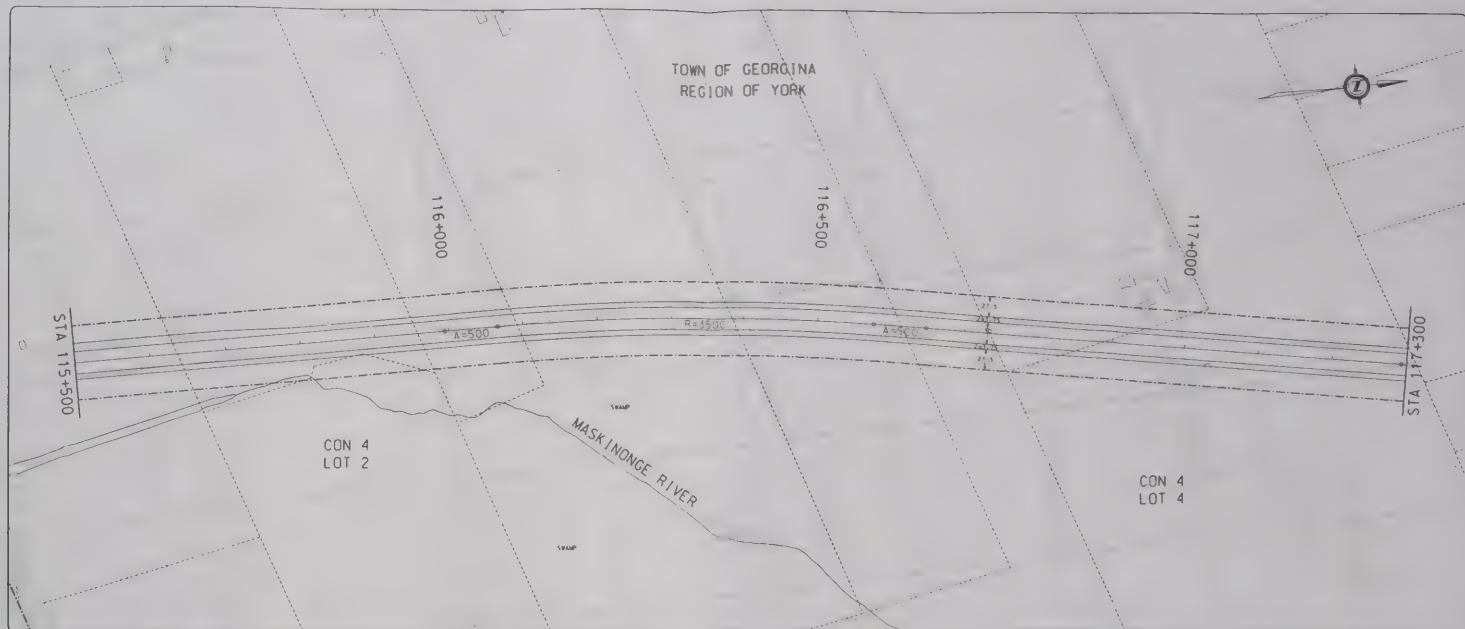




|  |   |  |  |   |   |                           |
|--|---|--|--|---|---|---------------------------|
| <p><b>Ontario</b><br/>Ministry of Transportation</p> | <p><b>HIGHWAY 404<br/>EXTENSION</b></p> <p>Devils Drive to Highway 12<br/>Route Planning Study and<br/>Environmental Assessment</p> |  | <p><b>LEGEND</b></p> <p>Existing Property Line<br/>Proposed R.O.W.</p> | <p><b>SCALE</b></p> <p>HORIZONTAL<br/>0 50 100</p> <p>VERTICAL<br/>0 5 10</p> | <p>Sta 113+700 to Sta 115+500<br/>Woodbine Avenue Interchange</p> | <p>PLATE<br/><b>9</b></p> |
|--|---|--|--|---|---|---------------------------|

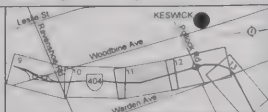
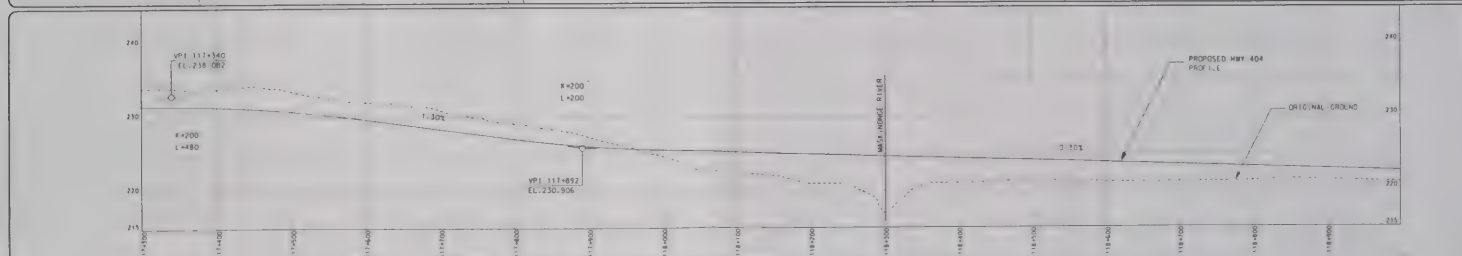
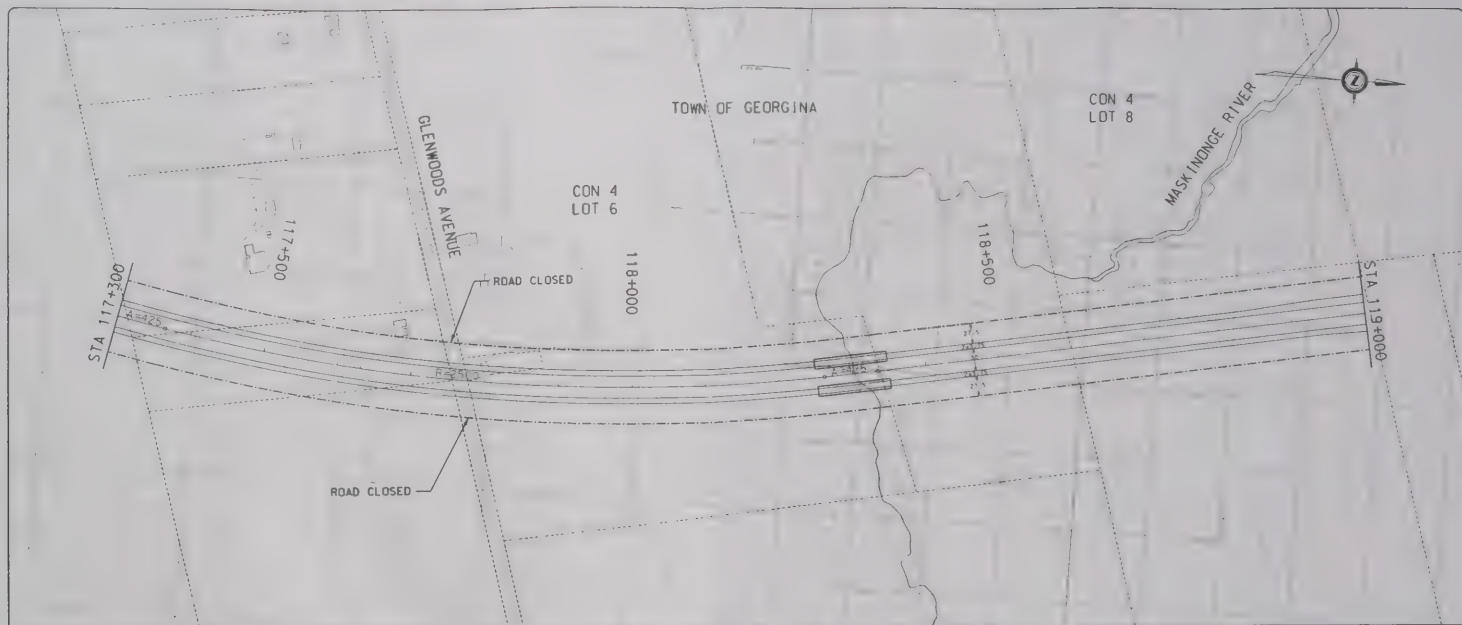




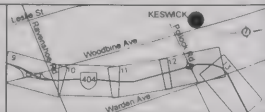
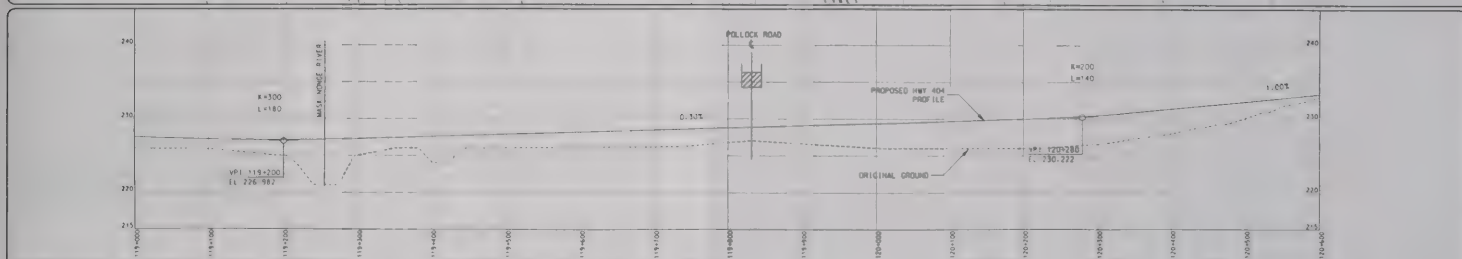
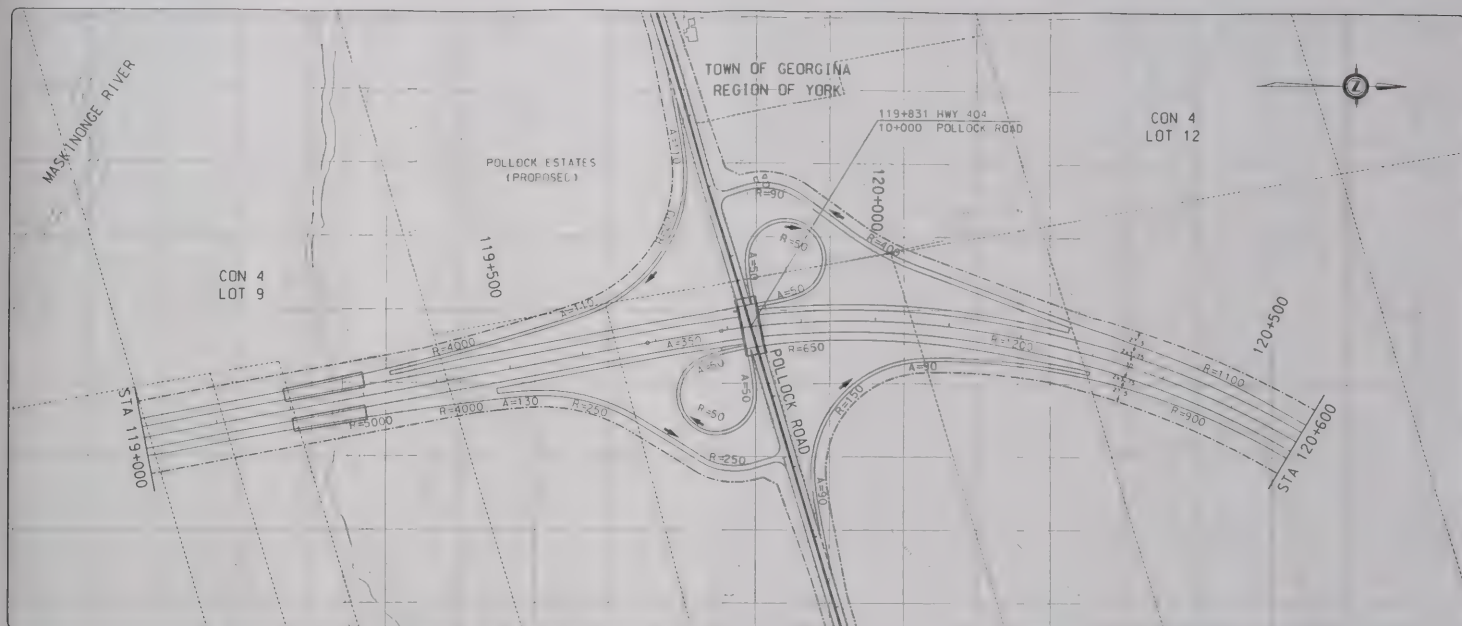












LEGEND

Existing Property Line  
Proposed R.O.W.

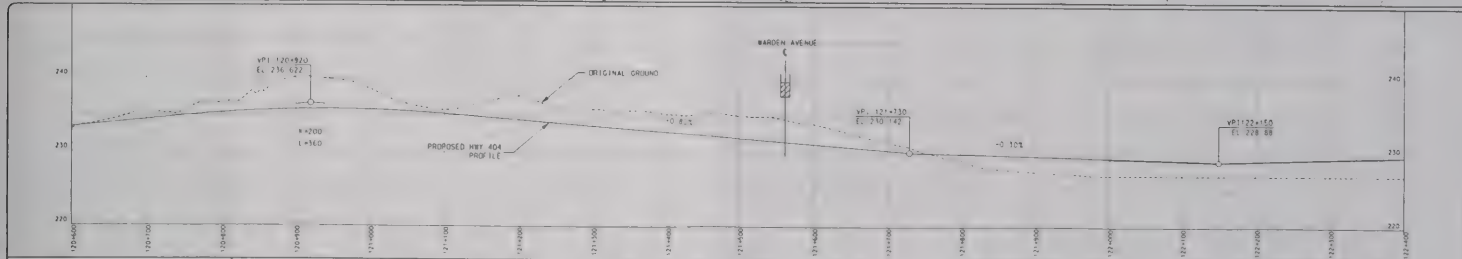
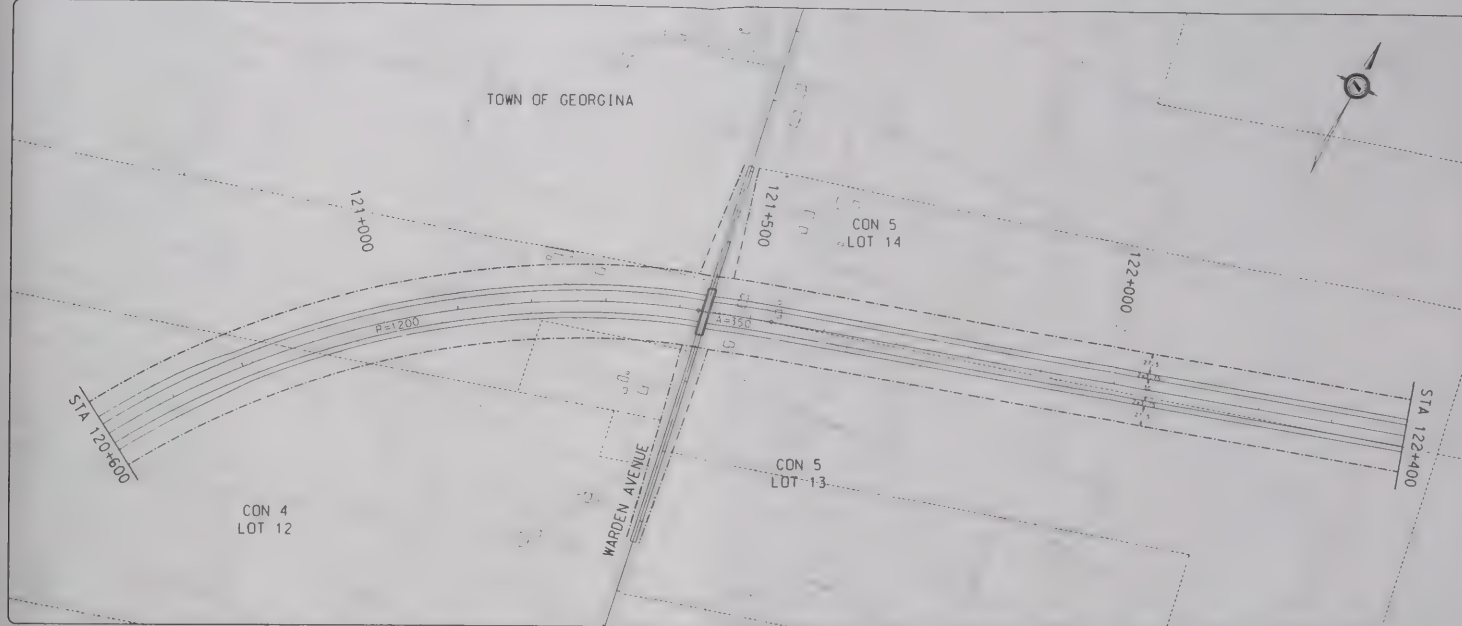
SCALE

HORIZONTAL  
0 50 100  
VERTICAL  
0 5 10

Sta 119+000 to Sta 120+600  
Pollock Road Interchange







LEGEND

Existing Property Line   
Proposed R.O.W.

SCALE

HORIZONTAL

VERTICAL

Sta 120+600 to Sta 122+400

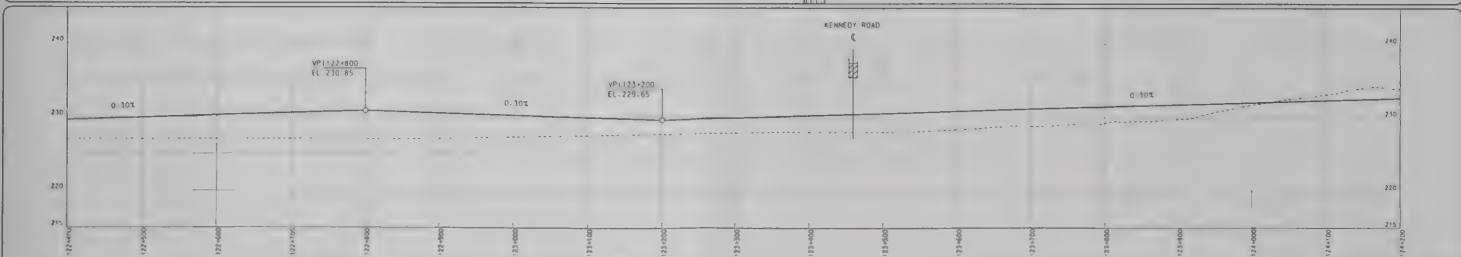
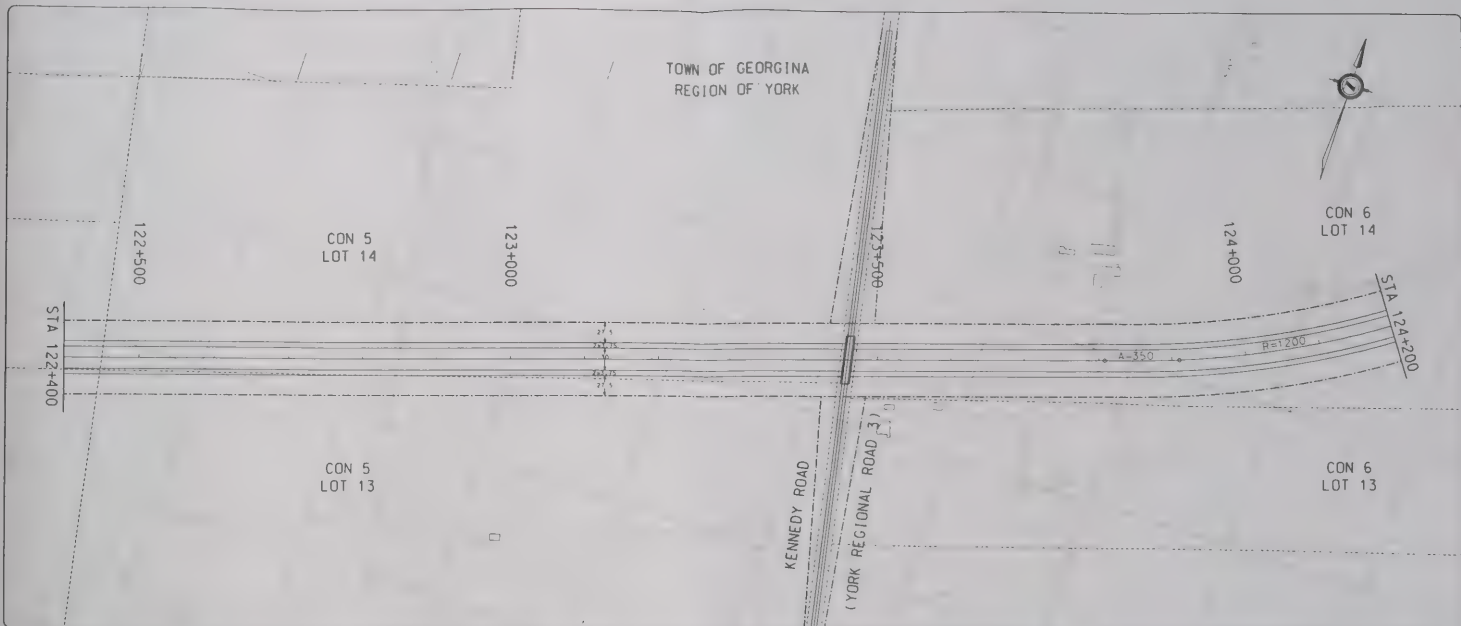
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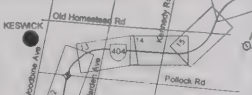


PLATE

**13**

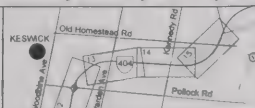
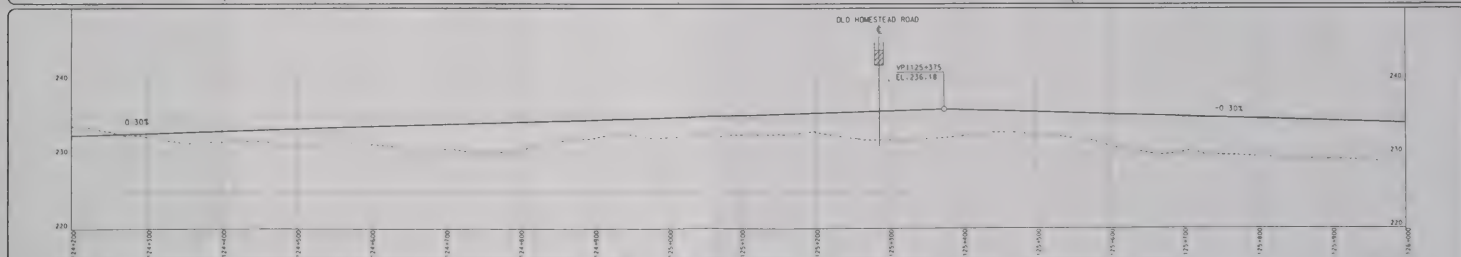
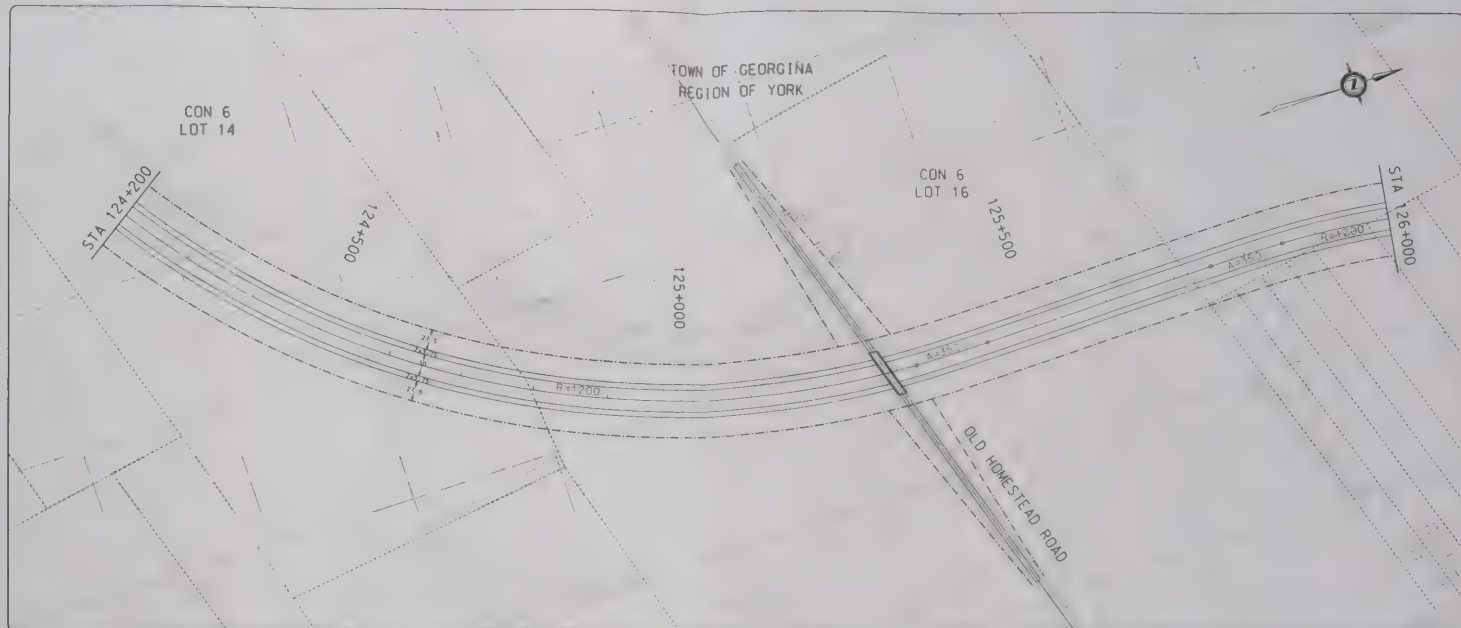






|   |   |  |  |   |  |                    |
|---|---|--|--|---|--|--------------------|
| <br><b>Ontario</b><br>Ministry of Transportation | <b>HIGHWAY 404<br/>EXTENSION</b><br>Davis Drive to Highway 12<br>Route Planning Study and<br>Environmental Assessment |  | <b>LEGEND</b><br>Existing Property Line ———<br>Proposed R.O.W. ——— | <b>SCALE</b><br>HORIZONTAL<br><br>VERTICAL<br> | Sta 122+400 to Sta 124+200<br>Kennedy Road | PLATE<br><b>14</b> |
|---|---|--|--|---|--|--------------------|





**LEGEND**

Existing Property Line  
Proposed ROW

**SCALE**

HORIZONTAL  
0 50 100

VERTICAL  
0 5 10

Sta 124+200 to Sta 126+000

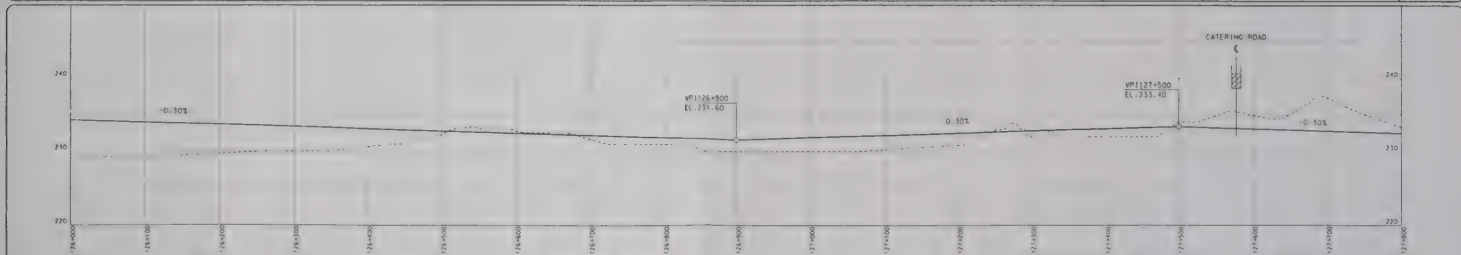
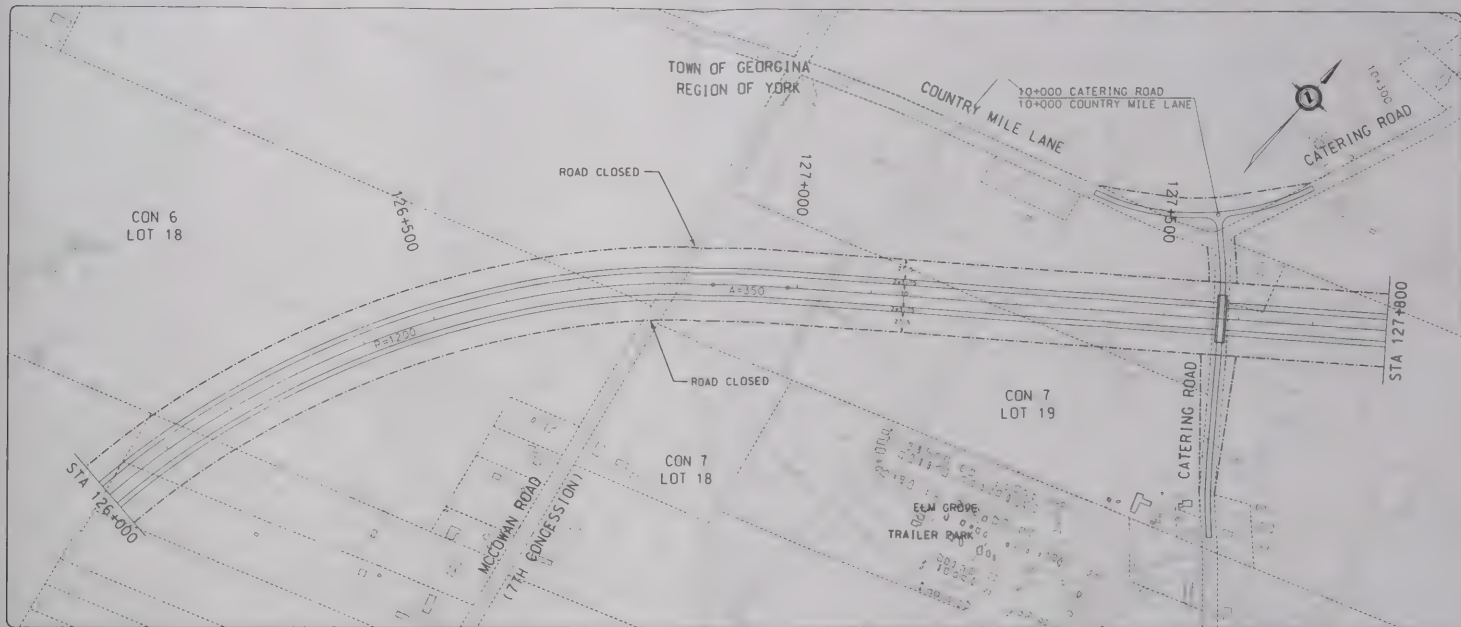
Old Homestead Road

PLATE

**15**







**LEGEND**

Existing Property Line .....  
Proposed R.O.W. ....

**SCALE**

**HORIZONTAL**  
0 50 100

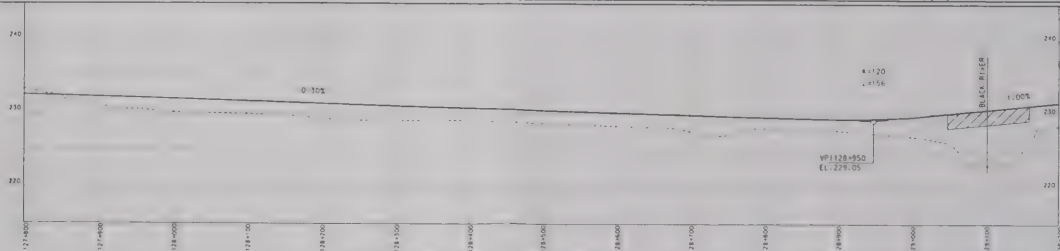
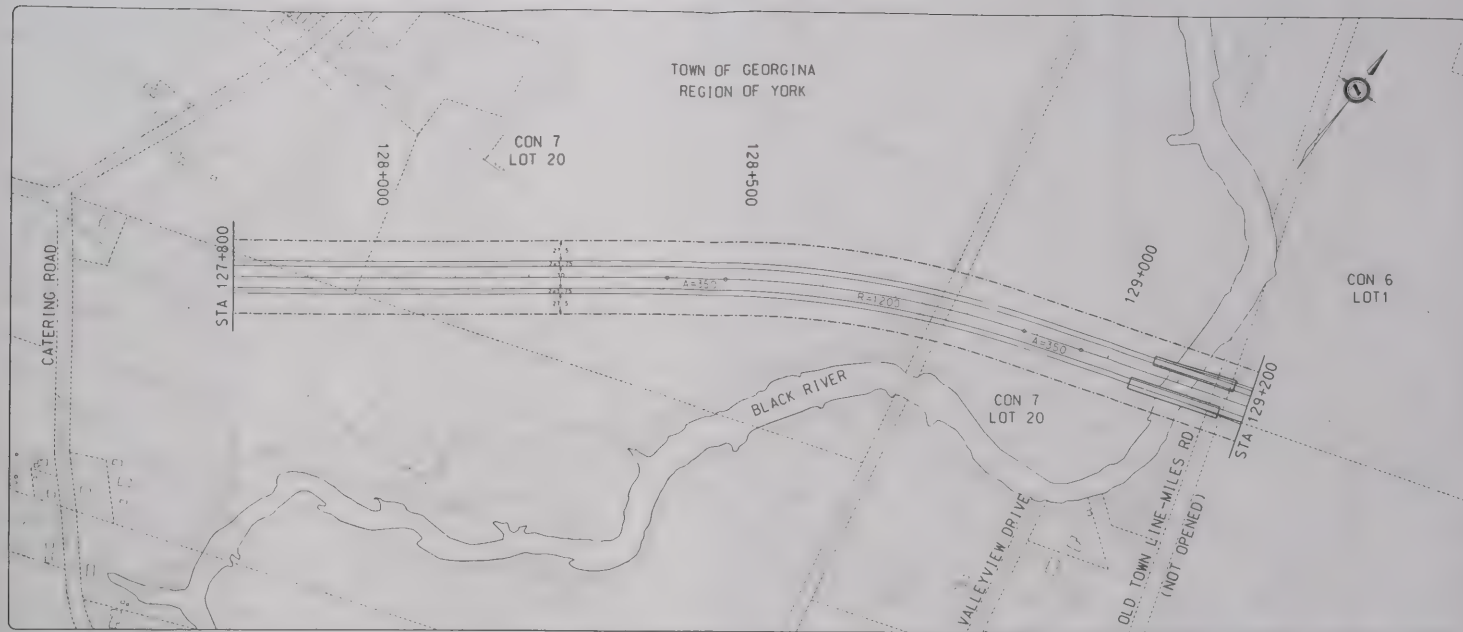
**VERTICAL**  
0 5 10

Sta 126+000 to Sta 127+800

Catering Road









# **HIGHWAY 404 EXTENSION**

Davis Drive to Highway 12  
Route Planning Study and  
Environmental Assessment



## **LEGEND**

Existing Property Line   
Proposed R.O.W. 

## **SCALE**

HORIZONTAL 

VERTICAL 

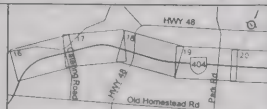
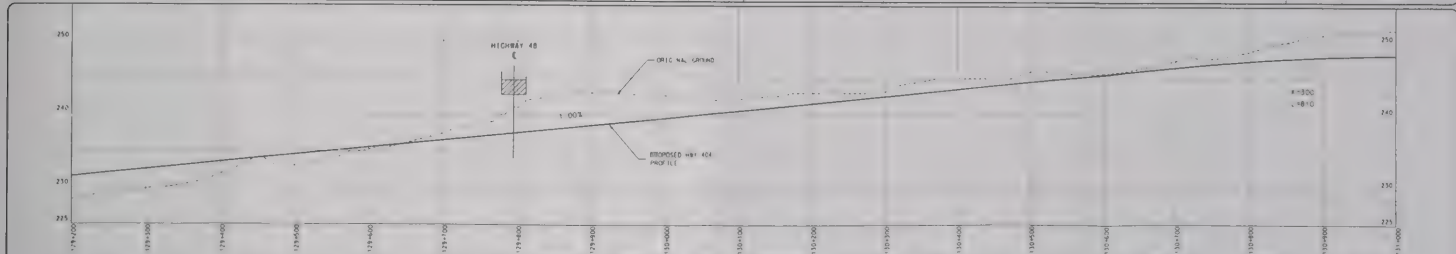
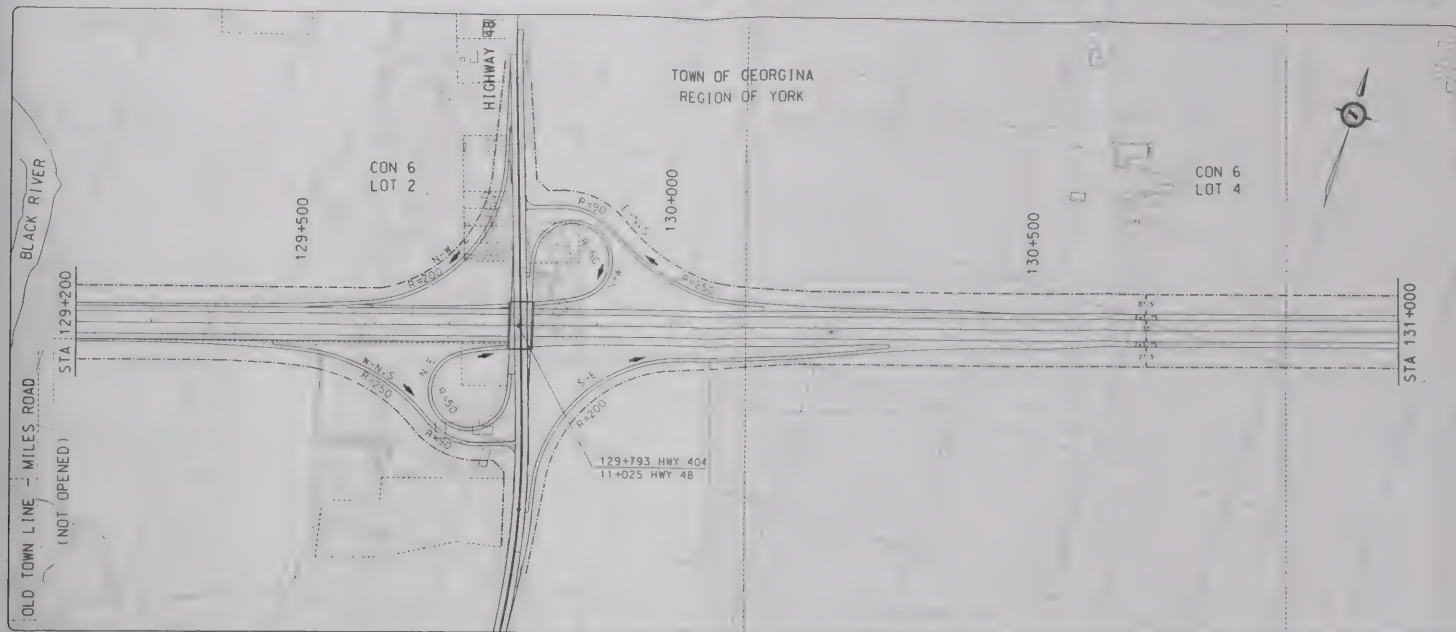
Sta 127+800 to Sta 129+200

Black River

PLATE

17





**LEGEND**

Existing Property Line  
Proposed ROW

**SCALE**

HORIZONTAL  
0 50 100  
VERTICAL  
0 5 10

Sta 129+200 to Sta 131+000

Highway 48 Interchange

PLATE

18





STA 131+000

CON 6  
LOT 5

131+500

TOWN OF GEORGINA  
REGION OF YORK

132+000

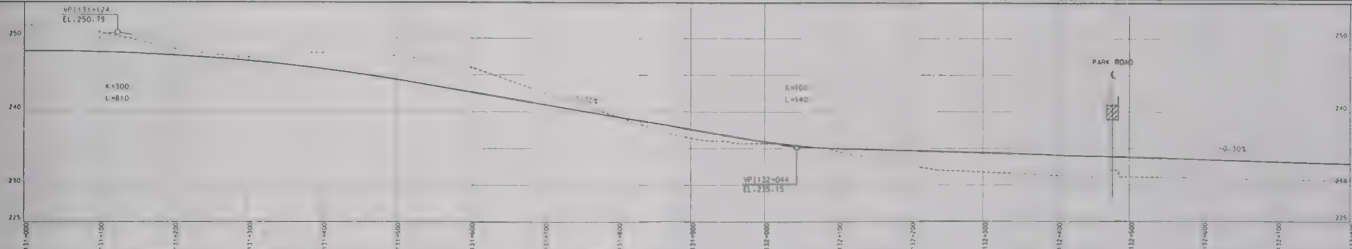
CON 6  
LOT 6

132+500

PARK ROAD

(YORK ROAD 18)

STA 132+800







TOWN OF GEORGINA  
REGION OF YORK

CON 6  
LOT 8

CON 6  
LOT 9

134+500

STA. 134+600

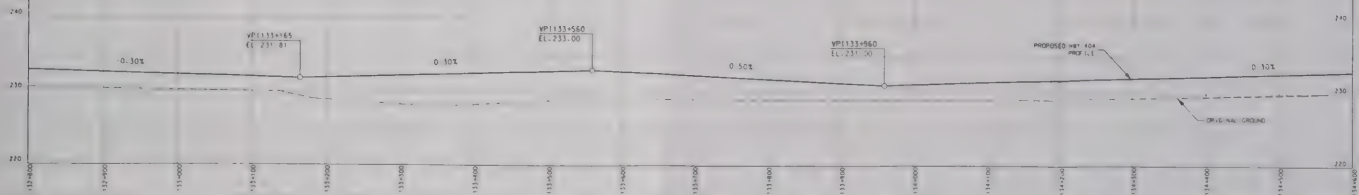
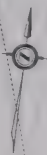
STA 132+800

133+000

133+500

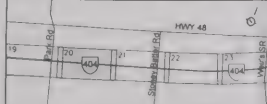
134+000

6TH CONCESSION



**HIGHWAY 404  
EXTENSION**

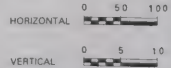
Davis Drive to Highway 12  
Route Planning Study and  
Environmental Assessment



**LEGEND**

Existing Property Line  
Proposed ROW

**SCALE**

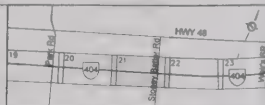
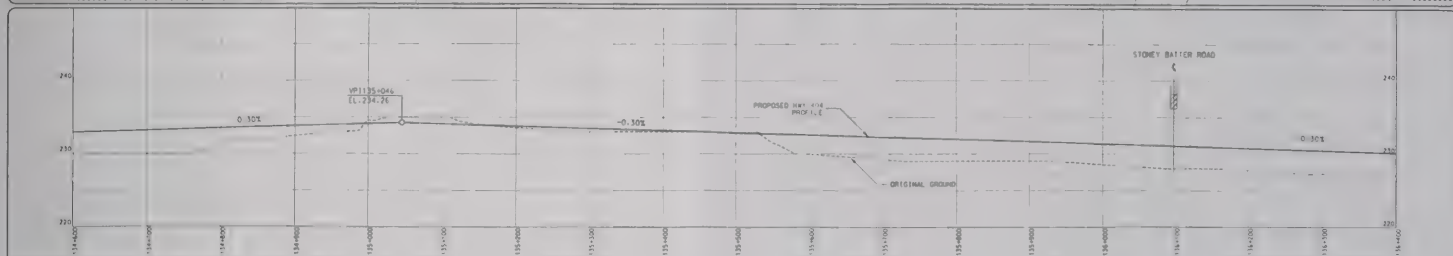
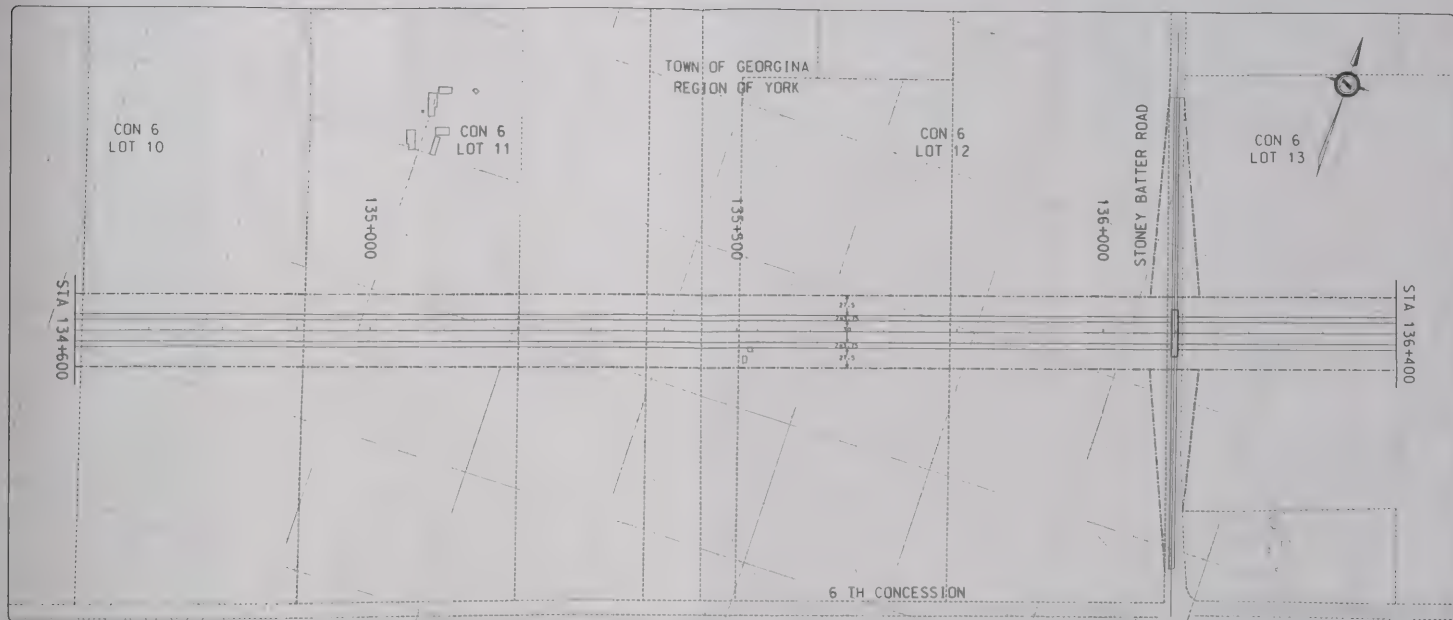


Sta 132+800 to Sta 134+600

PLATE

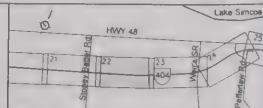
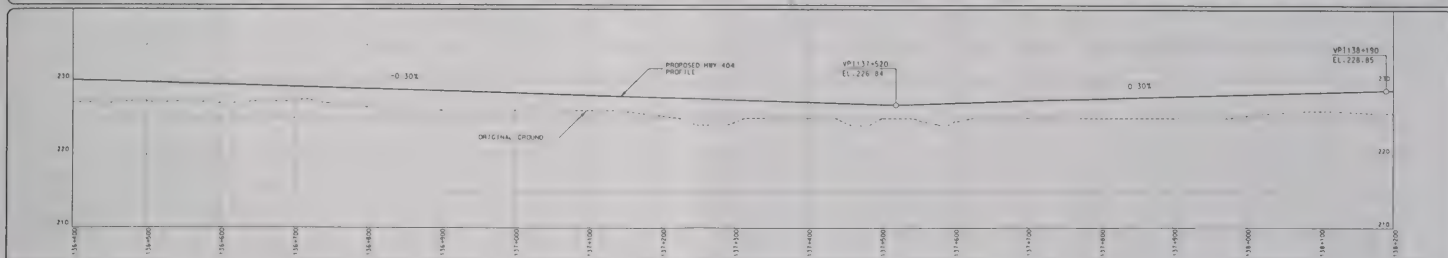
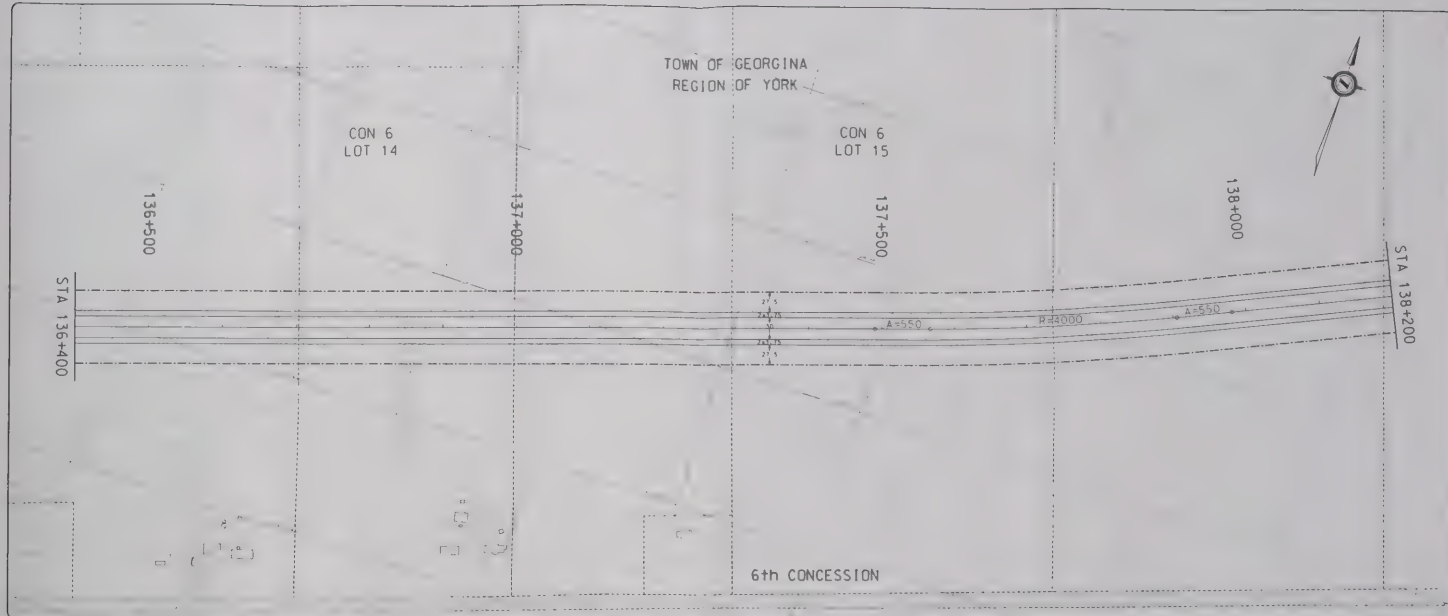
20











LEGEND

Existing Property Line  
Proposed R.O.W.

SCALE

HORIZONTAL

VERTICAL

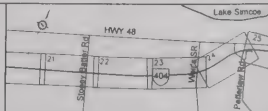
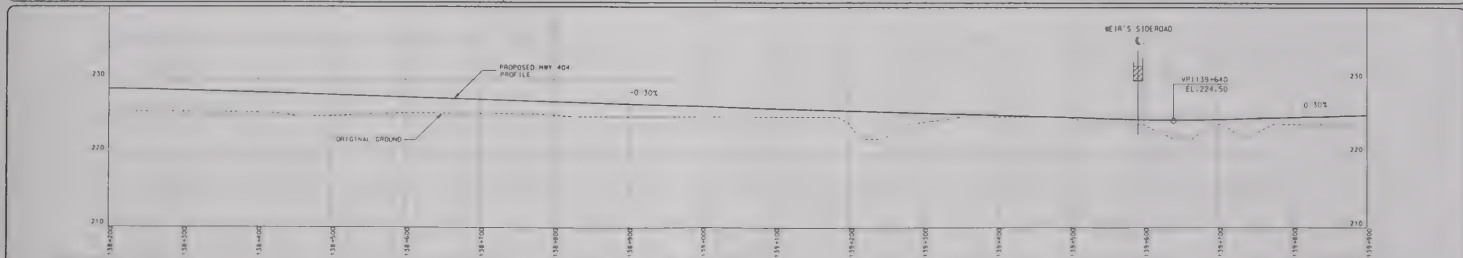
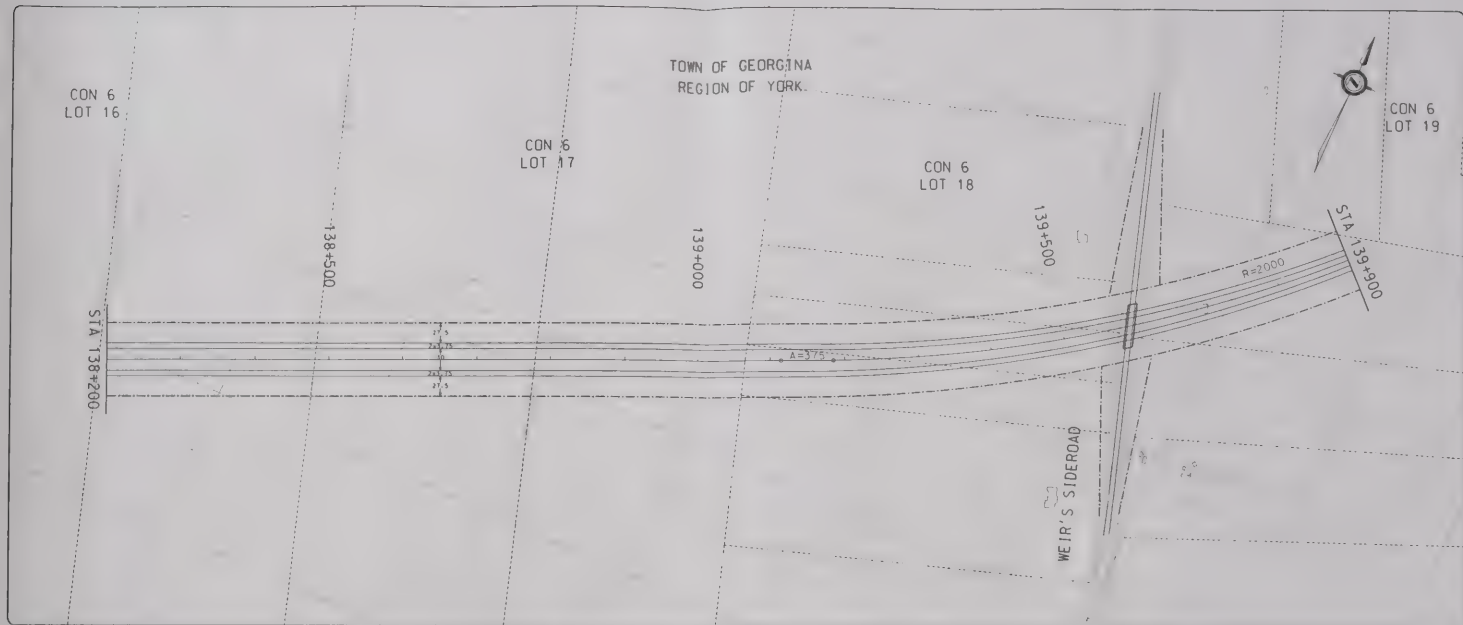
Sta 136+400 to Sta 138+200

PLATE

22







**LEGEND**

Existing Property Line ———  
Proposed R.O.W. - - - - -

**SCALE**

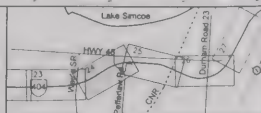
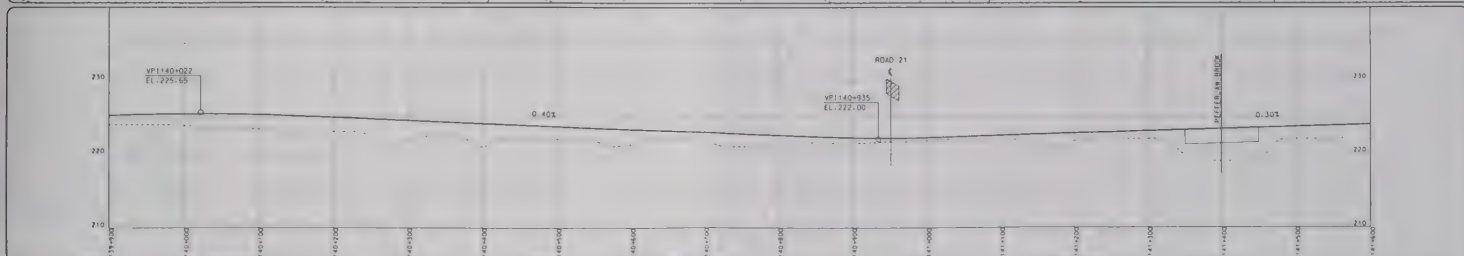
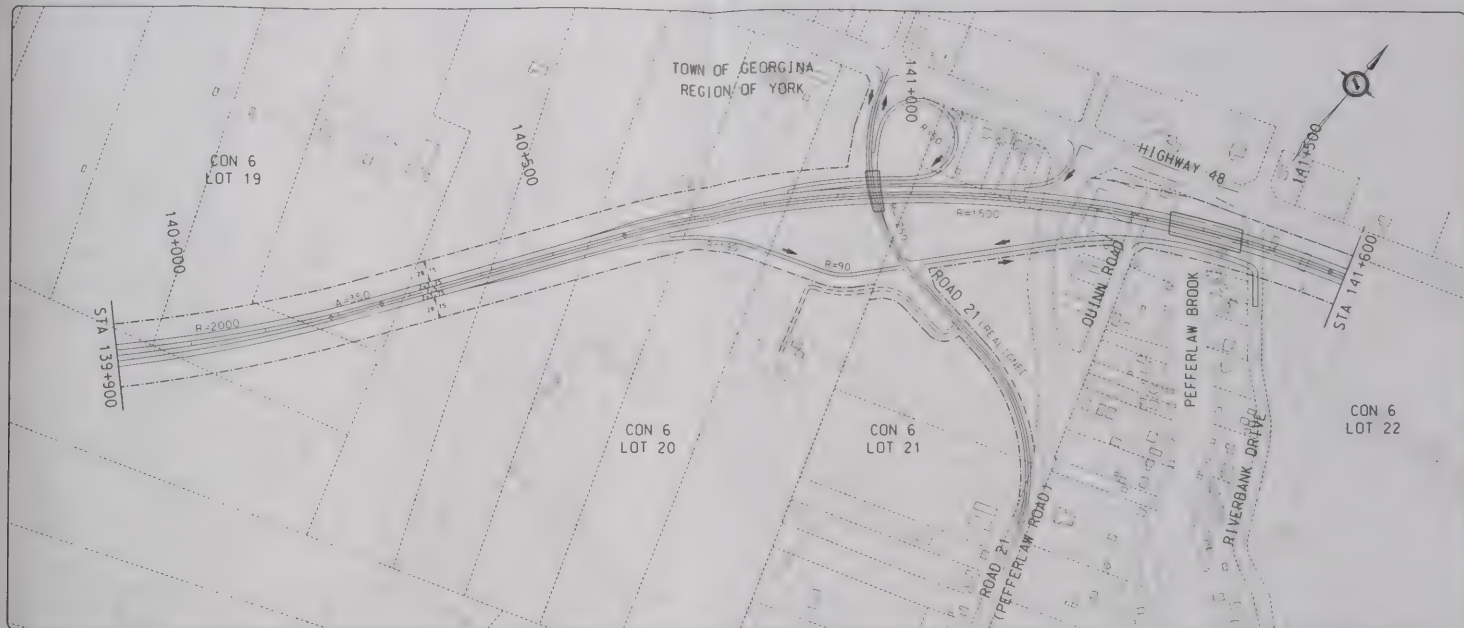
HORIZONTAL  
0 50 100

VERTICAL  
0 5 10

Sta 138+200 to Sta 139+900

Weir's Sideroad





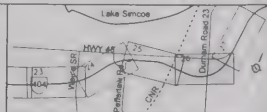
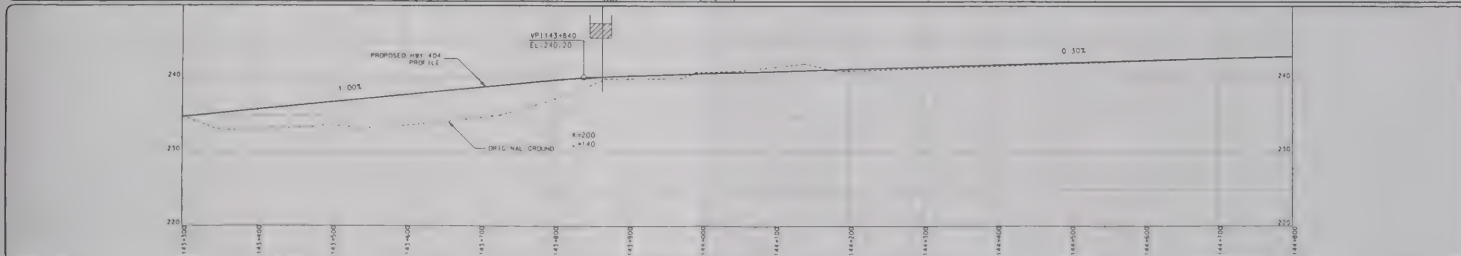












**LEGEND**

Existing Property Line .....  
Proposed R.O.W. ....

**SCALE**

HORIZONTAL 0 50 100

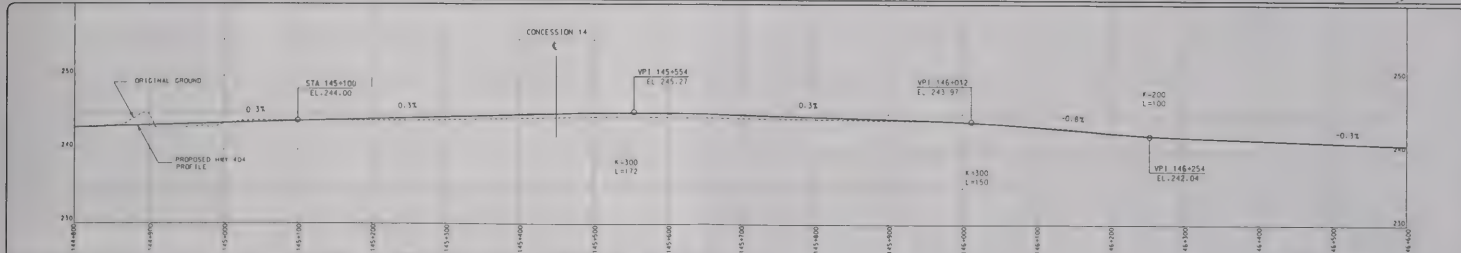
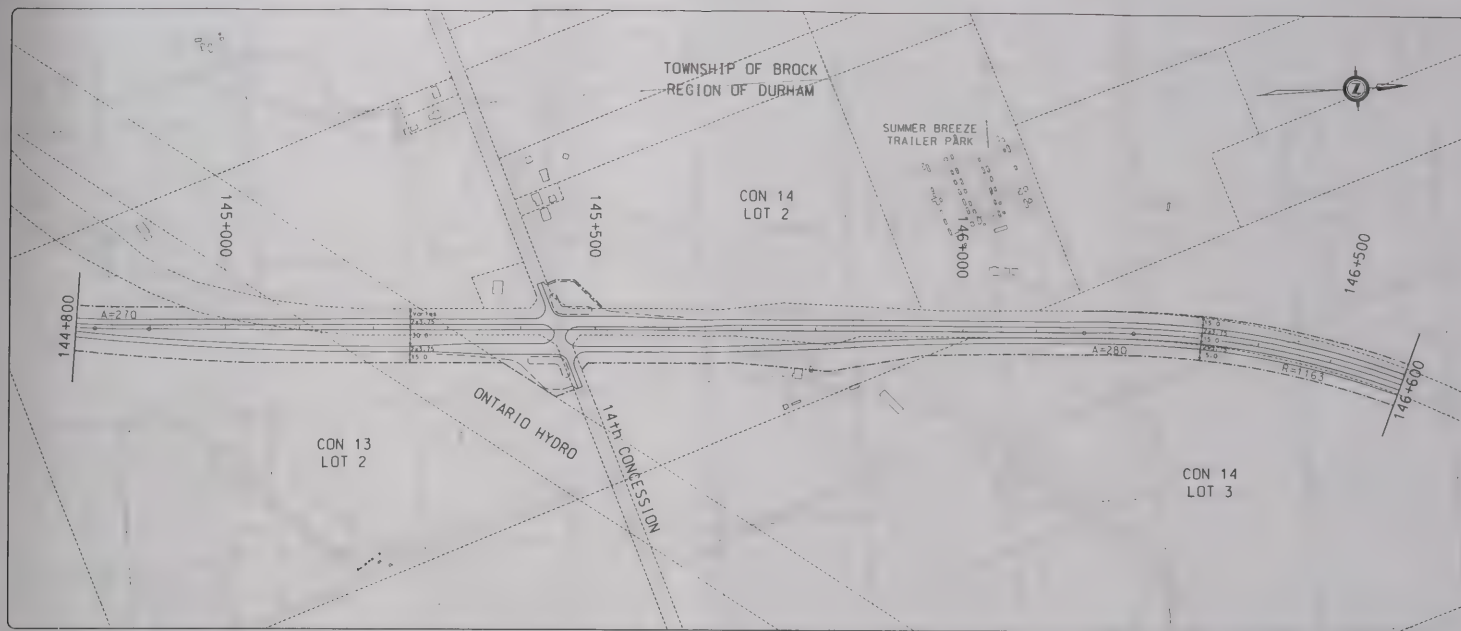
VERTICAL 0 5 10

Sta 143+300 to Sta 144+800  
Durham Road 23 Interchange

PLATE

**26**









TOWNSHIP OF BROCK  
REGION OF DURHAM

CON 1  
LOT 19



CON 1  
LOT 21

147+500

148+000

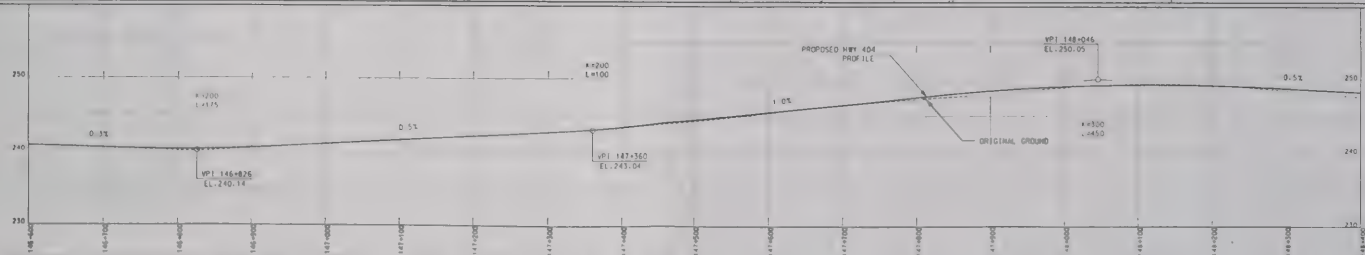
STA 148+400

147+000

CON 14  
LOT 4

ONTARIO HYDRO

STA 146+600



**CS** COLE  
SHERMAN

## HIGHWAY 404 EXTENSION

Davis Drive to Highway 12  
Route Planning Study and  
Environmental Assessment



### LEGEND

Existing Property Line  
Proposed R.O.W.

### SCALE

HORIZONTAL



VERTICAL



Sta 146+600 to Sta 148+400

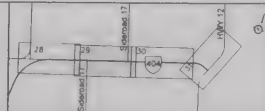
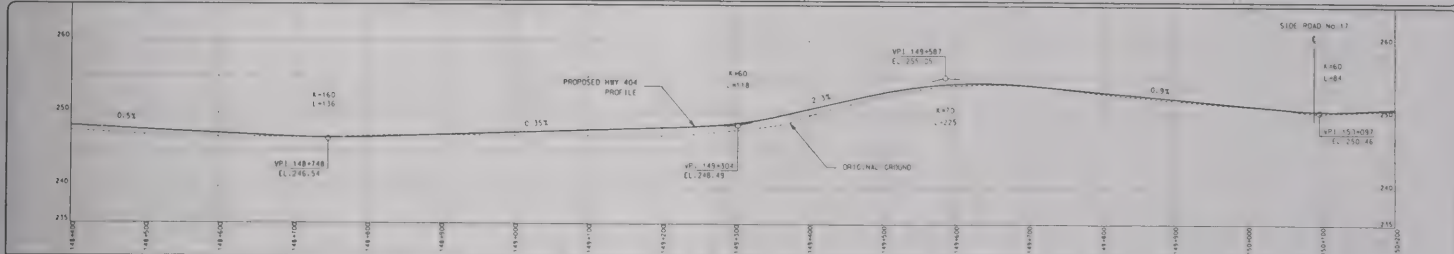
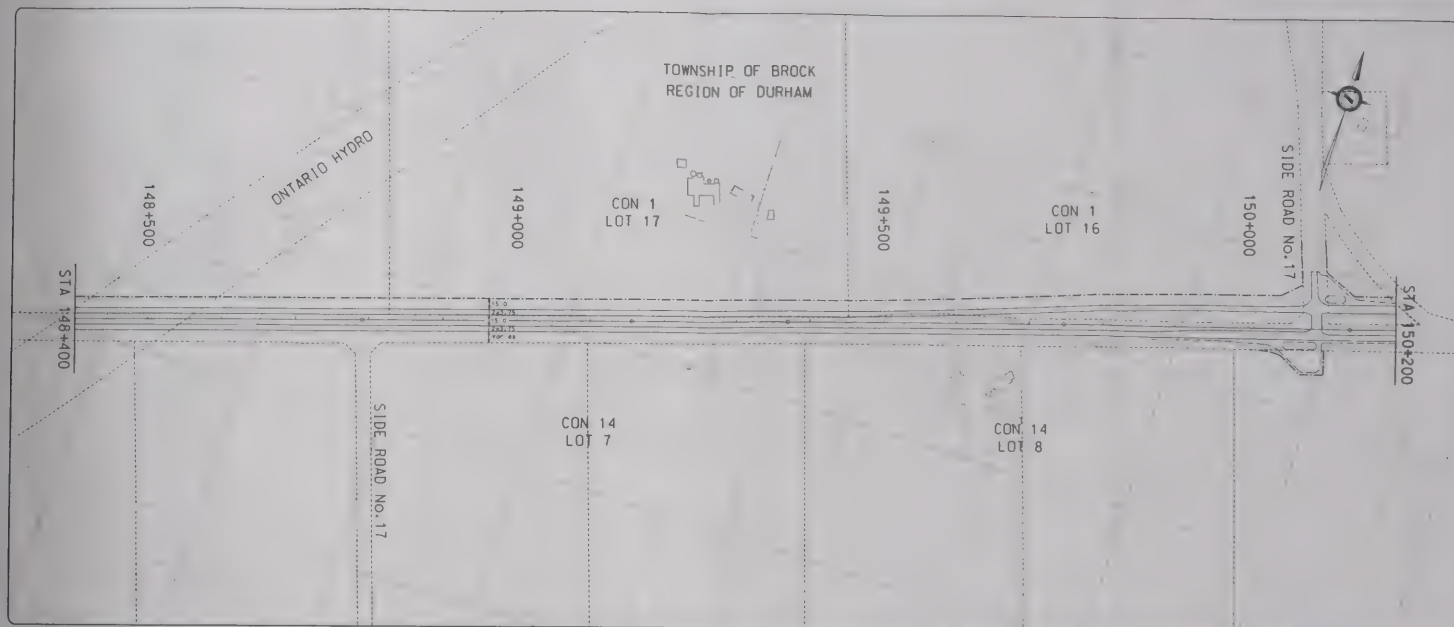
Highway 48 East

PLATE

28







LEGEND

Existing Property Line  
Proposed R.O.W.

SCALE

HORIZONTAL

VERTICAL

Sta 148+400 to Sta 150+200

PLATE

29



TOWNSHIP OF BROCK  
REGION OF DURHAM



CON 1  
LOT 14

CON 1  
LOT 13

150+500

151+000

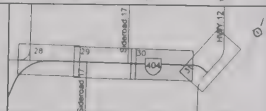
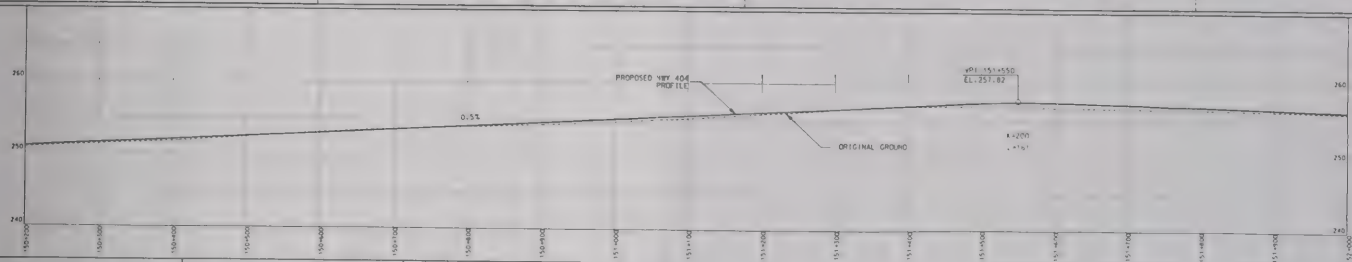
151+500

STA 150+200

STA 152+000

CON 14  
LOT 10

CON 14  
LOT 11



LEGEND

Existing Property Line .....  
Proposed R.O.W. ....

SCALE

HORIZONTAL 0 50 100

VERTICAL 0 5 10

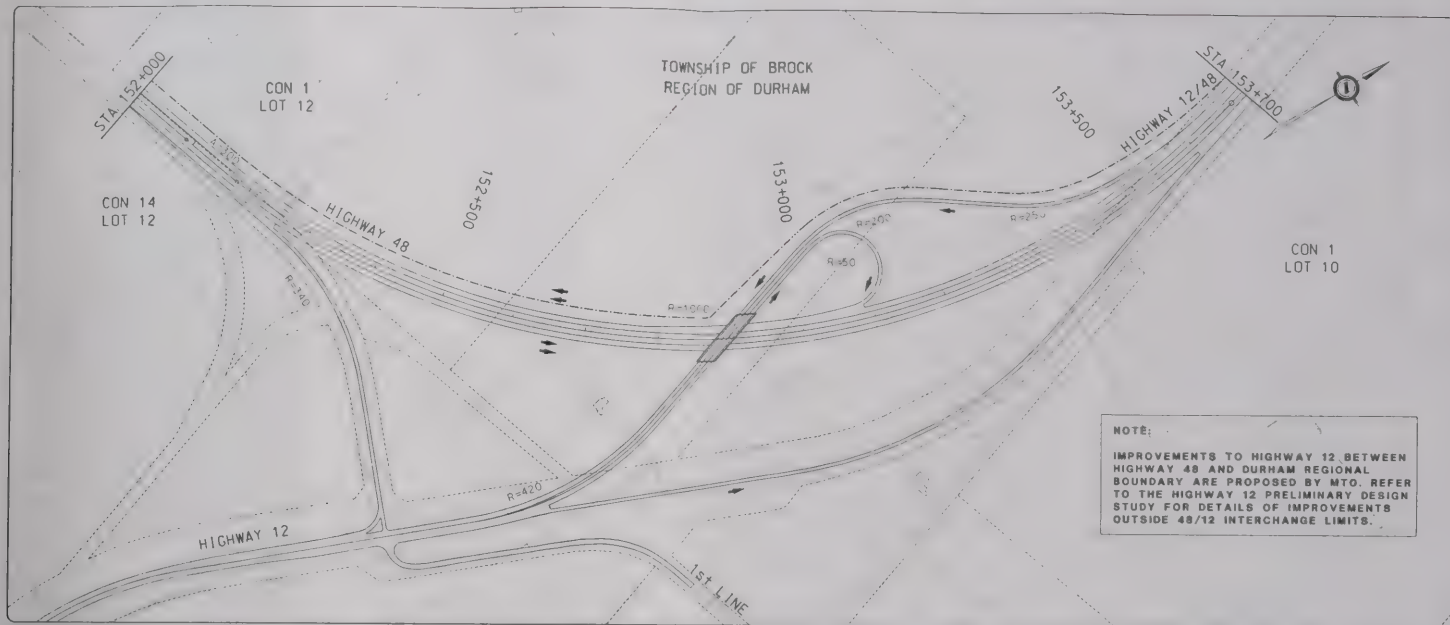
Sta 150+200 to Sta 152+000

PLATE

**30**

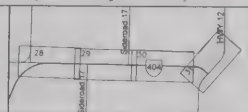
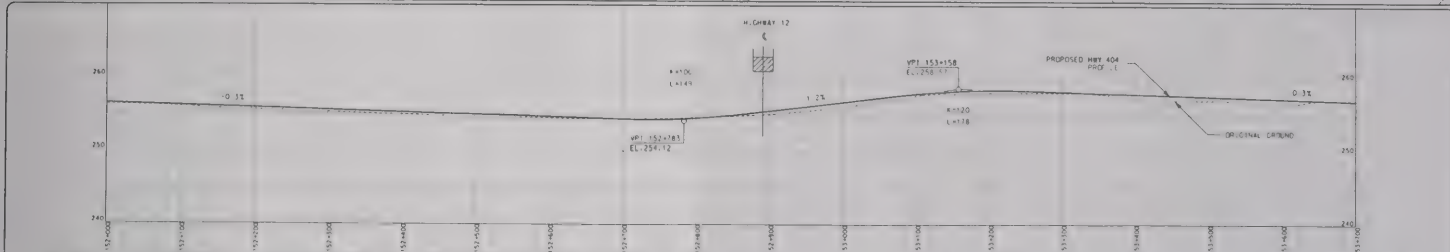






**NOTE:**

IMPROVEMENTS TO HIGHWAY 12 BETWEEN HIGHWAY 48 AND DURHAM REGIONAL BOUNDARY ARE PROPOSED BY MTO. REFER TO THE HIGHWAY 12 PRELIMINARY DESIGN STUDY FOR DETAILS OF IMPROVEMENTS OUTSIDE 48/12 INTERCHANGE LIMITS.



**LEGEND**

Existing Property Line  
Proposed ROW

**SCALE**

HORIZONTAL  
0 50 100

VERTICAL  
0 5 10

Sta 152+000 to Sta 153+700

Highway 12/48

PLATE

31





